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The purposes of this study were to: (1) identify and cluster occupational titles, (2) identify, rate, and cluster groups of competencies, (3) determine whether there are differences in level of competencies needed, (4) determine the experience background preferred, and (5) determine the type of inservice education being provided employees of agricultural supply stores. Data were collected by interview from 95 persons in cooperative agricultural supply stores and from 63 persons in 13 independent agricultural supply stores. The stores were purposively selected to represent all sections of the state and to get equal representation of stores with low, medium, and high number of employees. Some conclusions were: (1) There were meaningful occupational title groups of service worker, salesman, office worker, manager, sales and office worker, and service worker (equipment), (2) Occupational advancement in agricultural supplies required additional training in agricultural and business competencies for all occupational titles studied, and (3) Mmore than three-quarters of the interviewees in both stores indicated that a farm background was most desirable for occupations in the agricultural supply stores. (DM)

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Teacher Education Research Series
Volume 7, Number 2
June, 1966

AN ANALYSIS OF OCCUPATIONAL TITLES AND COMPETENCIES NEEDED IN OFF-FARM AGRICULTURAL SUPPLIES BUSINESSES

(The data were from employee interviews in ten cooperative and thirteen independent businesses in Pennsylvania that provide livestock feeds, seed, fertilizer, agricultural chemicals, small equipment and services primarily to farmers.)

by

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/ AN ANALYSIS OF OCCUPATIONAL TITLES AND COMPETENCIES NEEDED IN OFF-FARM AGRICULTURAL SUPPLIES BUSINESSES.7

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A report of research supported in part by
State funds designated for New Agricultural Research

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CHAPTER I

INTRODUCTION

Agriculture is a dynamic and changing industry in a scientific age. New developments and rapid changes in agricultural technology and economics are causing increased specilization in agricultural production, processing, and marketing. These new developments and changes have created complex educational needs for persons employed in off-farm occupations which involve knowledge and skill in agricultural subjects. Modern day agricultural businesses require the services of competent and dedicated workers to provide the supplies and services that farmers need. The new requirements must be met by changing patterns of education and training (25).

General Statement of the Problem

The major purposes of this study were to identify groups of occupational titles and competencies, and to determine differences in levels of business and agricultural competencies associated with entry and advancement in occupations in agricultural supplies stores. Further considerations were to determine the experience background preferred for employment in agricultural supplies stores, and to determine the type, amount, and source of in-service education for employees in agricultural supplies stores.

Scope and Limitations of the Study

This study was a survey of agricultural supplies businesses that have managers with a genuine interest in the improvement of employees. The businesses were selected to represent different store sizes and two different types of agricultural supplies business organization in Pennsylvania. The stores were also widely distributed over the different major agricultural sectors of the state.

The number of stores from which the sample to be interviewed was drawn included only agricultural supplies stores that handled agricultural chemicals, livestock feeds, seed, fertilizer, small equipment, and that provided various services. The interview schedule developed to record the data needed was constructed with the consideration that persons to be interviewed would be employees with limited time at a busy season of the year.

Data were collected from interviews with 95 persons in ten cooperative agricultural supplies stores and from interviews with 63 persons in thirteen independent agricultural supplies stores. An attempt was made to interview all employees. This was sometimes impossible as certain employees were not available.

The analysis of occupational titles and competencies in two types of agricultural supplies stores was not for the purpose of comparing the two types of stores but for the purpose of including a representative sample of each of the two major types of agricultural supplies stores in Pennsylvania.

Need for the Study

The aggregate gross sales of agricultural supplies stores in the United States totaled forty billion dollars in 1960. The typical store does an annual business of almost one-half million dollars per year and in many instances represents the community's largest business (25).

The number of employees in a store varied from two or three up to thirty or forty depending upon the total volume of business and the nature of the products and services provided. The employees of agricultural supplies stores are in quite different situations than employees in the meat packing industry, the farm machinery manufacturing industry, and other highly unionized industries. Employees have responsibilities that are quite different in the several occupational titles and usually have some decision-making responsibilities.

Employees of these stores deal directly with farmers and must be able to give sound management advice when selling the various products and services. They must have a thorough agricultural background and a general understanding of approved farm practices in their local area. New crop varieties, new developments in fertilizers and their application, new feed ingredients and methods of livestock feeding, new farm chemicals and methods of using them, new and improved farm machines and equipment, and automation in crop and livestock production are a few of the technological developments with which employees must be quite familiar (25).

Persons working in agricultural supplies stores usually rely upon an agricultural background, on-the-job experience, and some formal training to keep abreast of changing technologies and to make occupational advancements. However, as responsibilities continue to change and become increasingly complex, the advanced education of managers and other key employees becomes an increasingly important aspect of a successful business operation.

Teachers of vocational agriculture now have the opportunity, if not indeed the responsibility, to provide pre-employment and advanced educational programs. Federal legislation has now authorized agricultural courses which prepare students for related occupations in agriculture. The implementation of such programs depends upon the identification of the knowledges, skills, insights, and attitudes needed in agricultural supplies and the development of appropriate teaching materials.

Some studies have indicated that only one out of ten boys now enrolled in vocational agriculture classes in high schools will become actively engaged in farming. Teacher educators and teachers of agriculture are aware of the current situation and are in the process of making the necessary adjustments. Teachers are requesting and receiving more training in the specialties of various crops, livestock, soils, and agricultural mechanics courses. Vocational guidance is also receiving more emphasis in high school vocational agriculture courses.

Teacher education departments and teachers are faced with similar problems. Both are currently gathering all available reference materials and research findings, and both are attempting to develop instructional materials which would best contribute to the teaching of courses in off-farm agricultural occupations.

Three issues facing the development of high school and adult education curriculums for agricultural supplies can be put in the form of questions:

1. What are the major occupational titles or groups of occupational titles for which curriculums should be developed?
2. What are the groups of agricultural and business competencies needed for occupational entry and advancement?
3. What are the differences in levels of competency needed for occupational entry and advancement?

These questions must be answered through the process of research.

Needs for employees with competencies in agricultural science and business have been established by local and state studies (32). Because the need was great for information that would aid in the preparation of instructional materials and the counseling of students in high schools, area vocational-technical schools, and in adult education programs, it seemed desirable to conduct a study that would identify groups of occupational titles and competencies, and differences in the levels of competencies needed for occupational entry and advancement.

CHAPTER II

THEORETICAL FRAMEWORK AND RELATED LITERATURE

Some of the nations greatest economic and social achievements have occurred in American agriculture. Sweeping advances in farm technology have increased this country's agricultural output sufficiently enough to fulfill rapidly expanding domestic needs and contribute to foreign needs as well (24).

In 1935 agricultural employment in the United States was stable at about ten million people. As man-hour productivity increased the demand for agricultural products grew much more slowly. Wilcox and Cochrane (36) explained this in economic terms by the following statement:

> The income elasticity for farm food products is now in the neighborhood of 0.2--meaning that the consumption of farm food products by the average consumer increases 2 per cent with a 10 per cent increase in his income. Consumers in the 1950's prefer to use additional income to purchase automobiles, durable goods, sporting goods, vacations, and services with their income, rather than food.

The rapid rise in productivity accompanied by the slowly rising demand caused agricultural employment to fall below five million by 1964. For many years agriculture had been looked upon as one of the greatest sources of jobs for workers with below-average educational attainment. However, the technological revolution and changes in consumer demand have caused this to no longer be true.

Low skilled jobs and the sectors in which such jobs have existed are now disappearing. Killingsworth (14) reports that two factors have been responsible for this change:

> Two fundamental factors produced changes in the patterns of demand for labor. The first is an enormous expenditure in the past 25 years on research and development, which has given a new direction to technological change. The second is the rising affluence of the American people, which has changed patterns of consumer spending.

The changes in consumer demands and patterns of consumer spending as they pertain to agricultural employment are pointed out vividly by Wilcox and Cochrane (36):

> Consumers purchase two very different categories of resources in what is commonly called food: (1) farm products, and (2) non farm resources converted into services associated with and built into farm products. Consumers are ready and eager to buy more conveniences associated with farm products as their income rises.

The services associated with and built into farm products have created many off-farm occupations not directly involved in the production of food and fiber. These occupations require a knowledge of agriculture and are in the processing and marketing of farm products and in providing services to farmers.

In 1916 the total farm population numbered 32.5 millions. By 1965, only 12 million people remained on the farms. From 1960 to 1965 the number of people leaving the farms averaged 800,000 per year. In the favorable situation of an expanding economy, millions of persons formerly underemployed in farming have obtained employment in non-agricultural or related off-farm occupations. Diminishing necessity to operate small farms have meant that fewer farm youths enter farming. Also, an increasing proportion of farmers have been able to add off-farm work as a means of supplementing their income. About four of every ten farm operators have off-farm jobs (17).

In the past, such large-scale adjustments have been worked out by the competitive job market. Recent government educational programs reflect the need for a more rationalized approach to the development and use of human resources. The transformation of agricultural manpower requirements is a process which must be aided by education (17).

Purposes and Objectives of Vocational and Technical Education

Agriculture like other business and industry is experiencing rapid and continual change. The changes have raised questions as to what the term "agriculture" includes and implies. The U. S. Department of Health, Education, and Welfare (21) defined agriculture as:

> Agriculture is a broad category of which "production agriculture" is only one phase.

> Farming, in turn, is a group of occupations, with each occupation requiring specific skills and abilities, some similar and some different. Moreover, farming is the basic root from which all other phases of agriculture grow---distribution, processing, and services occupations.

A list of areas of subject matter content in agriculture taught in elementary, secondary, junior colleges, and adult programs in public schools was prepared by a committee working with the U. S. Office of Education. The list was a revision of a proposed outline developed by the ad hoc Committee for [illegible] Agriculture which met in Washington, D. C. on February 14, to 16, 1966. The instructional areas listed were (23):

1. Agricultural Production
2. Agricultural Mechanics
3. Agricultural Supplies
4. Agricultural Products
5. Agricultural Resources
6. Forestry
7. Ornamental Horticulture
8. Other Agriculture

Related courses or units of subject matter in each area were also suggested for carrying on the learning experiences concerned with developing knowledge, skills, insights, and attitudes involved in preparation for entry and advancement in agricultural occupations. Agricultural supplies, the area of this study, was divided into the subject matter units of livestock feeds, seed, fertilizer, agricultural chemicals, and other, including small equipment. The term "agricultural supplies" was defined as follows (23):

> An organization of subject matter and learning activities which are concerned with the principles and practices involved in the processing, marketing, and servicing of agricultural supplies such as agricultural chemicals, livestock feeds, seed, fertilizer, and other supplies including small equipment. Many businesses are organized principally to provide services to agricultural production.

Descriptions and structures of instructional areas were made possible through the Vocational Education Act of 1963 (12). Section 10 B of this Act amended the previous legislation to provide that:

> Any amounts allotted for agriculture may be used for vocational education in any occupation involving knowledge and skills in agricultural subjects, whether or not such occupation involves work of the farm or of the farm home, and such education may be provided without directed or supervised practice on a farm.

Federal assistance is now available to prepare students for occupations which were not authorized by earlier programs. Training is geared to occupations which more realistically meet the needs of the job market. Passage of the Act substantiates the fact that vocational and technical education is an accepted responsibility of public education.

The purposes of vocational and technical education in agriculture are derived from the broad setting of our democratic society, the public schools, agricultural technology, vocational and technical education, and are stated as being threefold:

1. To contribute to the educational objectives of American public education;
2. To contribute to the controlling purpose of vocational education, which is to "fit persons for gainful employment"; and
3. Specifically, to provide training and retraining for youths and adults which is realistic in light of actual or anticipated opportunities for employment (21).

These purposes must be fulfilled with programs characterized by diversity, flexibility, and adaptability. Programs to be continued and evolved must provide the training and education needed by "all persons of all ages, in all communities" to enable them to acquire the technical skills, abilities, and knowledge needed for gainful employment in agriculture. Specifically, vocational and technical education in agriculture is concerned with:

1. Secondary school youths, out-of-school youths, and adults who wish full-time vocational and technical training for entry into agriculture;
2. Employed youths and adults who need vocational and technical training in agriculture to upgrade their occupational performance; and
3. Those youths and adults who cannot benefit from regular vocational and technical education programs in agriculture, but who can benefit from special programs designed to meet their needs (21).

Educational opportunities in agriculture are pointed out by the following major program objectives for vocational and technical education in agriculture:

1. To develop agricultural competencies needed by individuals engaged in or preparing to engage in production agriculture;
2. To develop agricultural competencies needed by individuals engaged in or preparing to engage in agricultural occupations other than production agriculture;
3. To develop an understanding of and appreciation for career opportunities in agriculture and the preparation needed to enter and progress in agricultural occupations;
4. To develop the ability to secure satisfactory placement and to advance in an agricultural occupation through a program of continuing education;
5. To develop those abilities in human relations which are essential in agriculture occupations; and
6. To develop the abilities needed to exercise and follow effective leadership in fulfilling occupational, social, and civic responsibilities (21).

Passage of the Vocational Education Act and subsequent revision of the purposes and objectives of vocational and technical education have provided the framework for the development of teaching materials for each instructional area.

Studies Related to Agricultural Supplies

The *Summary of Research Findings in Off-Farm Agricultural Occupations* (32) showed that the largest numbers of workers needing agricultural competencies are located in the instructional area of agricultural supplies. The summary also revealed that the occupational groups of manager, salesman, and service worker required the highest degree of competence. The number of employees needing agricultural competencies was found to have an expected increase of 20 per cent during the next five years.

Richardson (27) studied the training needs for farm related occupations in four Oklahoma counties and found that all farm related businesses showed an expected increase in employment. Vocational agriculture was found to be important training. Pre-employment training in agronomy, farm mechanics, and farm business management seemed to be important for occupations in the farm machinery, nursery production, and feed, seed and fertilizer businesses. Training in salesmanship and agricultural sciences were found to be very important to most occupations. He concluded that teachers of agriculture must become aware of the importance of present training in vocational agriculture for related occupations.

Cameron (6) surveyed Huntingdon County, Pennsylvania and found the largest increase in number of employees in the next five years was expected to be in the farm supplies and small equipment businesses.

Van Buren (34) studied employment opportunities and training needs in twelve selected farm related occupations in Central Ohio and found that 75 per cent of all opportunities were in firms dealing with farm machinery, agricultural supplies and equipment, and meat and dairy products.

Jones (13) used a job analysis approach to determine the training needs for selected agricultural occupations in Massachusetts. An interview schedule which included a comprehensive list of duties, skills, knowledges, and attitudes was used to rate six occupations by all agriculture teachers in the state. Findings pertaining to an agricultural supplies fieldman includes: 1) vocational agriculture was only partially meeting the training needs in skills and knowledges for individuals planning to enter this occupation; and 2) vocational agriculture was meeting to a high degree the training needs in the area of essential attitudes.

A 1964-65 Pennsylvania study (12) determined technical education needs of persons engaged in agricultural occupations in 29 counties. Of seven occupational families, the occupational area of agricultural supplies accounted for: 1) 7,111, or 28 per cent, of the 34,850 employees who needed agricultural competencies; 2) 7,693, or 29 per cent of the 37,795 workers anticipated to be employed five years hence; and 3) 2,663, or 31 per cent of the 12,171 employees to be hired in the next five years. Sixty eight per cent of the agricultural supplies store managers indicated that they preferred employees with a farm background. It was also found that eleven job titles accounted for 75 per cent of the agricultural supplies job titles identified by the study. Salesmanship, human relations, and business management were competencies needed in varying degrees by all employees. The study implied that vocational agriculture could support, or be supported by, other vocational subjects.

McGee (20) in a study of agricultural occupations in seventeen counties of Pennsylvania found that 74 per cent of the total number of off-farm businesses were in ornamental horticulture, farms supplies and equipment, and livestock and poultry industries.

A high school education was desired for beginning employment in 90 per cent of the responses from the business managers interviewed. Seventy eight per cent of the employers believed that short courses by the industry and on-the-job training could provide the training necessary for advancement. He concluded that vocational agriculture programs in Pennsylvania would need to be expanded to meet the demand for agriculturally trained workers in off-farm agricultural occupations.

Studies in agricultural supplies have been conducted in Iowa by Van Loh (35) and Mabon (16). Both men used a panel of specialists to develop a list of agricultural and non-agricultural competencies. The competencies were incorporated into mailed questionnaires.

Van Loh mailed a list of twenty nine agricultural and thirty six non-agricultural competencies needed by males employed in the retail fertilizer business to 120 Iowa licensed fertilizer dealers. The manager, a sales employee, and a service employee each evaluated the degree of competencies needed and possessed. Managers and sales employees indicated that a higher degree of competence was needed than was possessed in all of the competencies listed. He recommended that the competencies be taught in area technical schools, workshops by the fertilizer industry, short courses at Iowa State University, or vocational agriculture departments.

Mabon studied competencies needed by males employed in country elevator grain marketing by mailing a list of competencies to 155 Iowa elevator managers and to 155 of their employees. Each person evaluated himself as to the degree each competency was needed and possessed. Mabon concluded that as the level of job classification increased, the degree of agricultural competencies needed and possessed increased.

Mabon suggested that the competencies needed in country elevator grain marketing be taught in classes for juniors and seniors in vocational agriculture departments. He further suggested that specialized training and/or retraining be incorporated into the programs of adult classes, area technical schools, and short courses or workshops.

Love (15) studied job titles and competencies needed in off-farm agricultural occupations in Pennsylvania. By factor analysis he identified the occupational groups of managers, supervisors, bookkeepers, technicians, and service workers as being groups of occupations needing agricultural, business, and trade and industrial competencies for employment in agricultural supplies stores. Data indicated that employees needed a higher degree of competency in agricultural and business competencies than in trade and industrial competencies. He also found that there were differences in levels of training needed for occupational entry and for advancement.

Current research in the area of agricultural supplies is being conducted by Albracht (2) in Michigan. The project is concerned with the determination of vocational competencies for the performance of essential activities of sales personnel in the feed industry. A survey instrument containing competencies necessary for the performance of nine specified sales activities was submitted to a jury of eighteen experts who indicated whether the competencies are appropriate. Competencies rated appropriate were then submitted to the same jury for identifying loci at which each competency should be taught. Conclusions and recommendations will be made regarding the competencies to be taught and loci for teaching these competencies.

The Nation's Concern for Education

The beginnings of vocational education extends back beyond the dawn of recorded time when survival required that man teach his sons and daughters to perform the tasks necessary to provide food, clothing, and shelter. Later the needs for vocational education in the ancient nations of Europe and early colonial America were recognized by various apprenticeship systems (28).

By 1914 the technological development of the United States and the resulting critical need for vocational education caused Congress to conclude that vocational education was a wise investment for the federal government. In 1917 Congress passed the Smith-Hughes Act, which provided an annual grant of seven million dollars to be distributed to the states to promote and develop vocational education as it was related to agriculture, trades and industries, and homemaking. Since 1917 vocational education has contributed substantially to the welfare of the people of America. This is the viewpoint of Mason and Haines (18):

> Vocational education has developed into a specific phase of one's education which prepares him for entrance into and advancement in his vocation, the chief means of making a livelihood.

The Smith-Hughes Act was supplemented financially by the George-Reed Act of 1924, the George-Ellzey Act of 1934, the George-Deen Act of 1937, and the George-Barden Act of 1946 (28). The emergence of the "sputnik era" prompted Congress to pass the National Defense Education Act in 1958 (28). The Act provided 15 million dollars annually to aid in the development of area vocational programs for the training of highly skilled technicians.

The Area Redevelopment Act of 1961 (17) was the first effort of the Federal Government to provide assistance for the economic rehabilitation of depressed areas. The Act encouraged communities to analyze their economic resources and to develop plans for self improvement programs. The Act provided short term occupational training and equipped several thousand farm workers with marketable job skills.

The first nationwide program for the training and retraining of underemployed and unemployed workers was implemented with passage of the Manpower Development and Training Act of 1962 (1). By the end of 1965, fifteen thousand of the half million trainees had been trained for agricultural occupations. Approximately 80 per cent of the trainees received training for occupations in agricultural production. The other trainees received training for off-farm agricultural occupations.

In his message to Congress on American Education, February 20, 1961, President John F. Kennedy said (26):

> The National Vocational Education Acts, first enacted by the Congress in 1917 and subsequently amended have provided a program of training for industry, agriculture, and other occupational areas. The basic purpose of our vocational education effort is sound and sufficiently broad to provide a basis for meeting future needs. However, the technological changes which have occurred in all occupations call for a review and re-evaluation of these acts, with a view toward their modernization.

Accordingly, the Secretary of Health, Education, and Welfare appointed a Panel of Consultants on Vocational Education. After studying strengths and limitations of the program the Panel recommended that the vocational and technical education programs be expanded. In relation to agricultural education, the Panel recommended (26):

> The vocational agriculture program, under Federal reimbursement, should permit instruction for occupations related to agriculture as well as for actual farming.

As a result, the Vocational Education Act of 1963 was signed into law on December 19, 1963. It authorized larger sums of money and authorized use of funds for training in more occupational fields. Agricultural courses were broadened to include training for related occupations in production, processing, distribution, and service occupations.

The Economic Opportunity Act of 1964 helped States and Communities develop a wide range of occupational and educational programs. The Act had various sections dealing with education in agriculture (9).

The Public Works and Economic Development Act of 1965 (17) authorized 3.25 billion dollars for economic development. The new Act provided for public work grants, business loans, and expanded technical assistance and research programs to create long-term job opportunities. The Act provided a more realistic and flexible approach to the problems of farm people in rural areas.

The Rural Areas Development program of the U. S. Department of Agriculture (17) is another program formed to alleviate manpower problems and stimulate new job opportunities. Objectives of the program include expanding job opportunities, providing job training, creating new industries, and developing recreation enterprises.

Other important programs designed to further economic development, create jobs, and improve the utilization of manpower in farming areas include:

1. The Rural Community Development Service, which helps rural residents make effective use of government services when planning development projects;
2. The Pilot Rural Renewal Program, which provides loans and grants for studying and improving land utilization programs; (Research, technical, and financial assistance were also provided for development of recreation industries in rural areas.)
3. The Neighborhood Youth Corps, established by the Economic Opportunity Act, which provides youth in rural areas with useful work experience and offers assistance in planning realistically for their future; and
4. The Adult Basic Education Program, established by the Economic Opportunity Act, which is designed to teach people over 18 to read and write and to help them qualify for better jobs or for occupational training courses (17).

The federal education acts authorize a wide range of technical and vocational educational training and retraining programs to prepare youth and adults for the demands of today's and tomorrow's job markets. They are an indication of the nation's great concern for education. The implementation of training programs is now limited only by the identification and development of training programs for the occupational areas which are in need of education.

Education for Agricultural Supplies

The technological developments in the field of agriculture and the resultant importance of providing the best education possibilities for all workers has been the subject of recent state studies. The state studies have indicated that fulfillment of vocational and technical education purposes will require a merging of traditional occupational categories. Stevens (31) encouraged more cooperation among vocational services in the following statement:

> The recent state studies of competencies needed by persons to enter and to advance in off-farm agricultural occupations have brought out many instances in which supporting education in business and office, distributive, and trade and industrial areas is important. This fact but adds to the compelling urgency for development of new patterns of instruction.

Employees need and must receive training to apply the principles of science and business to the production, processing, distribution, and service operations in agriculture. The need for providing supporting education becomes more apparent with each new research finding.

Bass (3) in a study of agriculturally related distributive businesses in Virginia found that employers expressed a great need for employees trained in distributive as well as agricultural education. The study recommended that steps be taken to offer combination courses providing special training in special phases of both agriculture and distributive education.

Sutherland and Thompson (33) in a study of agricultural businesses in California reported that: "In the junior and senior years, the curriculum for students planning for careers in agri-business should include courses in appropriate business subjects." An Oregon study by Brown (4) also concluded that youth planning to work in agri-business should be given training in business and distributive education. The importance of providing the best educational opportunities motivated Hamlin (11) to write that "there is much to be gained from closer association of agricultural education with other vocational education."

The need for organizing new programs in agricultural education caused McClay to write (19):

> The number of persons wanting training for only one level of an occupation or any one cluster of occupations is too small to provide specialized training in most schools. Programs introducing specialized training can, however, be offered in many high schools. High schools can offer core or common ground units in agriculture applicable to most agricultural occupations.

The growth and prosperity of a business depends to a large extent on the increased productivity of its employees. This increased productivity can come through either professional development of present employees or by replacement with more productive new employees. Failure of agricultural supplies stores to keep pace with the changing economy and technologies and/or failure to permit growth of the business would of necessity cause farmers to satisfy their needs and services elsewhere (25).

Managers of agricultural supplies stores must be kept abreast of supplemental training programs. They must be aware of the purposes for and the possibilities and limitations of the different types of training available. Persons representing national leadership positions in the agricultural supplies industry have developed an awareness of the importance of education and its relationship to their business success. Schoeff (30) emphasized that technical service personnel would be of utmost importance to agricultural stores when he wrote:

> The key to success in marketing farm supplies is to offer quality products, competitively priced, backed up by technical service personnel to help solve the unexpected problem before it results in financial loss to the customer.

Roy (29) indicated that the agricultural supplies store customer of the future would have different demands when he stated:

> Farm dealers will have to be more customer-oriented rather than self-oriented. Farmers will be more attuned to farm supply operators who know and cater to a complete product and service program.

Copeland (8) probably recognized the key area of concern to the future operation of successful agricultural supplies stores when he wrote the following:

> Farmers of the future will increasingly rely upon those suppliers who can satisfy their needs for technological know-how to go along with the supplies. The pressure of the

> agricultural business will force farmers to be more innovator-minded than many of them are now. They will naturally gravitate toward those suppliers who themselves are innovator-minded,---always looking for new and better ways to do things. Business will go to the ones who are technically competent and aggressive.

The ability for stores to become "technically competent and aggressive" will depend upon the educational process.

The technological revolution in agriculture, the changes in consumer demands, the identification of opportunities in off-farm occupations, the federal education acts, and the position of leadership taken by the agricultural supplies industry have provided agricultural educators with an opportunity and responsibility to develop educational programs. The implementation of these programs will depend upon research findings to develop appropriate instructional materials.

CHAPTER III

DESIGN OF THE STUDY

Specific Statement of the Problem

The purpose of the study was to provide information that would aid the preparation of teaching materials and the counseling of students in high schools, area vocational-technical schools, and in adult education programs. The study determined differences between To Enter and To Advance competency factor scores and identified competency factors, occupational title groups, most desirable experience background, and type of in-service education for employees in agricultural supplies businesses. The specific objectives were:

1. To identify and cluster occupational titles at the To Enter and To Advance levels of performance and to determine commonalities among occupational titles in two types of agricultural supplies stores.

2. To identify, rate, and cluster groups of competencies at the To Enter and To Advance level for occupations in two types of agricultural supplies stores.

3. To determine whether there are differences in levels of competency needed for total, and by agricultural and business competency groups, in two types of stores analyzed separately from To Enter to To Advance for occupational title groups.

4. To determine the experience background preferred for occupations in agricultural supplies stores.

5. To determine the type of in-service education being provided employees of agricultural supplies stores.

Hypotheses

The hypotheses were formulated to determine differences in levels of competencies needed for To Enter and To Advance for occupational groups, to determine commonalities among occupational titles, to determine commonalities among competencies, to determine most desirable experience background for occupations in agricultural supplies, and to determine differences in types of in-service education for agricultural supplies. The hypotheses were stated in a positive manner to facilitate appropriate statistical treatments. The major hypotheses were:

1. There are meaningful occupational title groups at the To Enter and To Advance levels in cooperative and in independent agricultural supplies stores.

2. There are meaningful competency factor groups at the To Enter and To Advance level in the two types of agricultural supplies stores.

3. The level of competency needed To Advance is higher than To Enter for occupational title groups in the two types of agricultural supplies stores.

4. There are differences in experience background preferred for occupations in the two types of agricultural supplies stores.

5. There are differences in in-service education being provided employees of the two types of agricultural supplies stores.

Definition of Terms to be Used

Certain words and groups of words which appeared frequently throughout the discussion of the study are clarified by the following definitions:

Agricultural supplies store - is a business that sells commodities such as livestock feeds, seed, fertilizer, agricultural chemicals, small equipment and/or related services such as grinding and mixing of livestock feeds.

Cooperative agricultural supplies store - is a legal business corporation established, supported, and controlled by farmer businessmen and performs specific services for the members as a group.

Independent agricultural supplies store - is a single business owned by one person or corporation.

To Enter - is the level of competency needed by a person to become employable for an occupation in agricultural supplies stores.

To Advance - is the ability of an employee to improve in efficiency and to accept more responsibility while continuing in the occupational title.

Agricultural competency - is a skill and/or ability in, and/or a knowledge of, one or more of the areas of animal science, plant science, agricultural mechanics, and agricultural business management.

Business competency - is a skill and/or ability in, and/or a knowledge of, one or more of the areas of business management and economics, employer traits and job responsibilities, office skills and practices, employer-employee relations, and sales skills.

Competency factor - is a cluster of competencies that have commonalities or relationships to each other.

Competency factor group - is a cluster of either agricultural or business competency factors.

Occupational title - is the name given to an organized group of activities assigned to an individual worker in an agricultural supplies store.

Occupational title group - is a cluster of occupational titles that have similarities or the same basic needs for education.

Competency factor score - is the average of the competencies in each competency factor for occupational title factors in an occupational title group.

Development of the Survey Schedule

The review of literature indicated that persons employed in modern day agricultural supplies stores need a large amount of technical knowledge to do a competent job in their occupations. Clark (7) was aware of this when he devised a method for studying occupations. His findings showed that the method of studying needed employee competencies was a productive approach for identifying subject matter useful for training present and prospective workers for off-farm agricultural businesses and industries. Mason and Haines (18) also recognized the importance of identifying competencies when they wrote that: "When planning appropriate vocational education programs, we should look first at the people and their needs and their aspirations." Consequently, the first step in implementing this study was the development of an interview schedule identifying the competencies needed for different occupations in agricultural supplies stores.

A list of agricultural competencies and business competencies required for employment in agricultural supplies stores was developed through a critical review of literature. More specifically, literature in the subject matter areas of agricultural chemicals, livestock feeds, seed, fertilizer, small equipment, and business skills was studied. A review of literature indicated that survey schedules used in other state studies had included trade and industrial competencies. It was decided that competencies of this nature would be included with competencies for small equipment. Competencies were general but selected to be representative for each area.

The list of competencies was then submitted to selected individuals at The Pennsylvania State University who were well acquainted with each subject matter area. These individuals reviewed the list of competencies. The original list was revised upon their recommendations and organized into an interview schedule.

The survey schedule was divided into two sections. Section I contained forty agricultural competencies and Section II contained thirty business competencies. Each section was designed to that employees interviewed could respond to the importance of each competency for entering their occupational title or advancing in it. Their responses consisted of indicating whether the level of competency needed was low, medium, or high. Respectively assigned response values of one, two, and three were used in the statistical calculations. A review of Occupation Guidance for Off-Farm Agriculture (22) revealed major occupational titles found in many of the state studies. They were studied and the fifteen most representative occupational titles in agricultural supplies were chosen for the study. The following list gives the fifteen occupational titles and their Dictionary of Occupational Titles code numbers.

Fifteen Occupational Titles Used in the Study

Occupational Title	D. O. T. Code Number
Store manager	185.186
Production manager	185.168
Sales manager	185.168
Service manager	187.168
Office manager	185.168
Fieldman	180.118
Bookkeeper	210.338
Clerk-typist	209.588
Salesman	277.358
Sales clerk	290.478

Fifteen Occupation Titles - continued

Occupational Title	D. O. T. Code Number
Maintenance mechanic	424.883
Stationary mill operator	520.885
Mobile mill operator	520.885
Laborer	922.887
Truck driver	905.883

The Pilot Study

The survey schedule was field tested to determine its appropriateness and to provide data for a trial of the analysis procedure. The pilot study indicated that the area of services was not adequately covered by competencies included on the survey schedule. This area was examined further and competencies were added or revised. The pilot study also indicated that trade and industrial competencies were adequately covered in the survey schedule.

The final survey schedule included thirty nine agricultural competencies and twenty eight business competencies. Seven pertained to seed, six pertained to fertilizer, nine pertained to agricultural chemicals, seven pertained to livestock feeds, ten pertained to small equipment, eight pertained to business responsibilities, four pertained to sales and business skills, eleven pertained to management functions and economics, and five pertained to facilities and equipment.

Selection of the Sample

Agricultural supplies stores selected for the study were of two distinctly different types. One type was an independently owned store and the other type was a cooperative store owned by shareholders and/or farmers.

Information on independent agricultural supplies stores was obtained from the directory of the Pennsylvania Millers and Feed Dealers Association and information on cooperative agricultural supplies stores was obtained from the Personnel Office of the largest agricultural supplies cooperative in Pennsylvania. The geographic location of stores to be included in the study was considered to be an important variable that should be controlled as it was felt that products and services provided by stores would vary by a regions intensity of agricultural production. Therefore, it was decided to select stores from all sections of the state.

Contacts were made with various individuals at The Pennsylvania State University who were familiar with cooperative agricultural supplies stores in the state. They recommended thirty stores with managers who were interested in the selection and improvement of employees. Also, the recommendations were such that the number of stores with low, medium, and high numbers of employees were equal. Low represented one to five employees, medium represented six to ten employees, and high represented eleven to twenty employees.

Ten stores in different geographic sections of the state were then selected. Personnel managers approved the selections and sent each manager a letter which explained the purposes of the study.

Independent stores included in the study were recommended by the secretary of the Pennsylvania Millers and Feed Dealers Association. Thirteen stores with managers who had exhibited genuine interest in improvement of the industry were recommended. The numbers of stores with low, medium, and high numbers of employees were also equalized. The cooperative and independent stores included in the study were:

Cooperative Agricultural Supplies Stores

Store	Address
Agway, Inc.,	Bedford, Pennsylvania
Agway, Inc.,	Belleville, Pennsylvania
Agway, Inc.,	Butler, Pennsylvania
Agway, Inc.,	Clearfield, Pennsylvania
Agway, Inc.,	Lebanon, Pennsylvania
Agway, Inc.,	Milton, Pennsylvania
Agway, Inc.,	New Castle, Pennsylvania
Agway, Inc.,	Pomeroy, Pennsylvania
Agway, Inc.,	State College, Pennsylvania
Agway, Inc.,	Sunbury, Pennsylvania

Independent Agricultural Supplies Stores

Store	Address
Deibert Feed Service	Bedford, Pennsylvania
Big Valley Feed and Grain Company	Belleville, Pennsylvania

Independent Agricultural Supplies Stores - continued

Store	Address
Canonsburg Milling Company	Canonsburg, Pennsylvania
Woolever Seed and Supply	Catawissa, Pennsylvania
Kreamer Feed Store	Kreamer, Pennsylvania
Kintner Milling Company	Messhoppen, Pennsylvania
Mifflinburg Farmers Exchange Inc.	Mifflinburg, Pennsylvania
Snook's Mill	Mifflinburg, Pennsylvania
Andre and Son Milling Company	Montrose, Pennsylvania
Thompson and Mateja	New Wilmington, Pennsylvania
W. S. Crock and Sons	Nicholson, Pennsylvania
Audley B. Lott	South Montrose, Pennsylvania
Waynesburg Milling Company	Waynesburg, Pennsylvania

Collection of the Data

All stores selected for the study were informed of the project through a personal letter. The letter acquainted them with purposes of the study, explained how findings would be used, informed them of the time necessary to interview each employee, and requested their participation. Telephone calls were made to answer any additional questions about the study and to arrange a time and date for the interviews.

All interviews were conducted by the investigator. A uniform interviewing procedure was developed for elimination of interview biases. Interviews with each employee ranged in length from approximately ten minutes to fifteen minutes. The interview schedule was described for each interviewee and responses were recorded immediately. Data were collected from 95 persons in the ten cooperative agricultural supplies stores and from 63 persons in the thirteen independent agricultural supplies stores.

Analysis of the Data

Upon completion of the personal interviews the data were coded and punched on IBM cards for processing at The Pennsylvania State University Computations Center. The data were analyzed for To Enter and for To Advance by the following analysis procedure:

1. Correlations between competencies were computed separetely for both types of stores.
2. The correlation output was used as input data for selecting eight, ten, and twelve competency factors by using factor analysis.
3. The factor loadings from factor analysis were used as input data for the extraction of eight, ten, and twelve factors by varimax rotation.
4. The competencies with rotated factor loadings of .20 or larger from eight, ten, and twelve factors were identified and rank ordered.
5. The arrays for eight, ten, and twelve factors were studied and the array which had resulted in the

most clear-cut grouping of competencies was selected for further analysis.

6. The competencies in each cluster were examined for large point spreads in factor loadings or locations at which competencies changed in their commonalities, and the factors were named.

7. The competency factors were assembled under the areas of agriculture or business.

An inversion of the data made possible the separate factoring of occupational titles by using the same procedure used for factoring the competencies. Factor analysis and varimax rotation were set for four, five, and six factors and occupational title groups were named by approximately the same method used for naming competency factors.

The averages of the competencies in each competency factor were computed for the occupational titles in each occupational title group. The grand means and standard deviations of the competency factor scores were calculated and levels of competency needed for To Enter and To Advance were then computed by taking one-half of one standard deviation each way from the competency factor score mean. Competency factor scores which fell within one-half of one grand standard deviation from the competency factor score mean were classified medium. Competency factor scores above and below the medium range were classified high and low, respectively.

CHAPTER IV

PRESENTATION AND DISCUSSION OF DATA

This chapter presents the findings of the data collected by personal interviews with 158 persons employed in ten cooperative agricultural supplies stores and thirteen independent agricultural supplies stores. Data on the degree of competency needed for _To Enter_ and _To Advance_ were secured for fifteen different occupational titles. Professional activities of managers and geographical location of stores were main criteria. The survey schedule used for collecting the data is shown in Appendix A.

Factor Analysis of Occupational Titles

Hypothesis 1, there are meaningful occupational title groups at the _To Enter_ and _To Advance_ levels in cooperative and in independent agricultural supplies stores, was accepted as shown by data in Tables 1, 2, 3, and 4. Four programs were used for that part of the study. The programs were used twice: first, titles were analyzed for _To Enter_, and second, titles were analyzed for _To Advance_. The data were inverted and inter-correlations were obtained for occupational titles by use of a program which computed correlation coefficients of different ratings given to the same competency. Factor analysis then solved successively for the most dominant factors represented in the correlation matrix and the output from varimax rotation was used to determine clusters of occupational titles.

Occupational titles were factored for four, five, and six factors. The main purpose for this arbitrary decision was to obtain more information for identifying and naming the occupational title groups.

The rotated factor loadings for four, five, and six factors were decoded and studied to identify the occupational titles for To Enter and To Advance. Factor loadings were recorded as recommended by Fruchter (10):

> Loadings of .2 or less are usually regarded as insignificant, loadings of .2 to .3 as low, .3 to .5 as moderate, .5 to .7 as high, and above .7 as very high.

After determining and studying the titles with loadings of .2 or over in each factor, it was found that the program set for four factors had done the best job of clustering occupational titles with commonalities at both To Enter and To Advance levels. Rotated factor loadings in the fifth and sixth factors were quite low and titles also tended to be more conglomerated. Cut-off points were established by locating large point spreads in factor loadings or points at which occupational titles changed in their commonalities.

Table 1 shows the factored clusters for fifteen occupational titles from 95 persons in ten cooperative agricultural supplies stores at the To Enter level. Each occupational title group lists occupational titles that had commonalities or the same basic competencies needed To Enter occupations in that occupational title group.

Table 1. Occupational Title Factor Analysis of Competency Ratings for To Enter for 95 Persons in Fifteen Occupational Titles in Ten Cooperative Agricultural Supplies Stores

Occupational Title Group Occupational Title	Rotated Factor Loading
Factor 1 Service Worker	
Laborer	.81
Mobile mill operator	.80
Laborer	.79
Truck driver	.75
Mobile mill operator	.74
Mobile mill operator	.73
Stationary mill operator	.73
Stationary mill operator	.69
Truck driver	.66
Maintenance mechanic	.65
Truck driver	.62
Truck driver	.62
Truck driver	.61
Mobile mill operator	.61
Mobile mill operator	.59
Truck driver	.59
Mobile mill operator	.58
Laborer	.53
Laborer	.53
Laborer	.51
Factor 2 Salesman	
Sales clerk	.67
Sales clerk	.66
Sales clerk	.64
Fieldman	.64
Salesman	.61
Factor 3 Office Worker	
Bookkeeper	.87
Office manager	.81
Bookkeeper	.76

Table 1. continued

Occupational Title Group Occupational Title	Rotated Factor Loading
Factor 3 Office Worker - continued	
Bookkeeper	.76
Clerk-typist	.75
Office manager	.74
Bookkeeper	.73
Clerk-typist	.71
Clerk-typist	.70
Clerk-typist	.70
Clerk-typist	.68
Clerk-typist	.66
Bookkeeper	.66
Bookkeeper	.64
Clerk-typist	.62
Clerk-typist	.61
Factor 4 Manager	
Store manager	-.81
Store manager	-.72
Store manager	-.71
Store manager	-.71
Sales manager	-.63
Store manager	-.62
Service manager	-.58
Fieldman	-.56
Production manager	-.54
Service manager	-.53
Production manager	-.52
Store manager	-.52

Factor 1 included the skilled and semi-skilled occupations associated with the services aspect of agricultural supplies stores. Occupational titles responsible for the performance of sales functions were included in Factor 2. Occupational titles in Factor 3 were associated with the performance of business duties. During the interview process it was found that bookkeepers had less responsibility than clerk-typists for the performance of duties requiring agricultural product knowledge. Factor 4 included four of the five different types of managerial occupational titles selected for the study. During the interview process it was found that service manager was called an operations manager, and production manager was called a floor supervisor or assistant manager. These differences in occupational title names were recognized and occupational titles were recorded as related to the study titles.

Table 2 shows the factored clusters for fifteen occupational titles from 95 persons in ten cooperative stores at the To Advance level. Factors for To Advance were basically the same as for To Enter. Factor 1 included service workers who dealt with operation and maintenance of equipment. Factor 2 was named salesman. Managers appearing in Factor 2 were found to perform sales functions and to require skill levels similar to the sales clerk. They were found to have the performance of sales functions as one of their major responsibilities. Factor 3 included occupational titles which were named office worker and Factor 4 contained four of the five different types of manager

Table 2. Occupational Title Factor Analysis of Competency Ratings for To Advance for 95 Persons in Fifteen Occupational Titles in Ten Cooperative Agricultural Supplies Stores

Occupational Title Group Occupational Title	Rotated Factor Loading
Factor 1 Service Worker	
Mobile mill operator	-.79
Mobile mill operator	-.74
Mobile mill operator	-.70
Mobile mill operator	-.69
Laborer	-.63
Truck driver	-.63
Stationary mill operator	-.61
Mobile mill operator	-.58
Stationary mill operator	-.57
Laborer	-.56
Laborer	-.51
Stationary mill operator	-.49
Factor 2 Salesman	
Production manager	.62
Sales clerk	.60
Production manager	.57
Sales clerk	.53
Salesman	.50
Stationay mill operator	.49
Sales manager	.46
Service manager	.45
Factor 3 Office Worker	
Bookkeeper	.89
Bookkeeper	.89
Bookkeeper	.87
Office manager	.80
Bookkeeper	.78
Bookkeeper	.76
Clerk-typist	.72
Store manager	.71
Clerk-typist	.71

Table 2. continued

Occupational Title Group Occupational Title	Rotated Factor Loading
Factor 3 Office Worker - continued	
Office manager	.70
Store manager	.70
Production manager	.69
Factor 4 Manager	
Store manager	.88
Service manager	.83
Production manager	.78
Production manager	.73
Sales fieldman	.72
Store manager	.68
Store manager	.68
Store manager	.66
Mobile mill operator	.65
Production manager	.63
Sales manager	.61

occupational titles selected for the study. Office manager did not cluster with other manager titles because his job was primarily concerned with direct supervision of the accounting and clerical staff in larger stores.

Table 3 shows the factored clusters for 11 occupational titles from 63 persons in thirteen independent stores at the _To Enter_ level. Occupational titles of service manager, maintenance mechanic, fieldman, and office manager were not found in the thirteen independent agricultural supplies stores selected for this study. Failure to find these titles is explained by the fact that duties specified for the titles were assigned to individuals in different occupational titles. The structural organization of independent stores was found to be less uniform than that of the cooperative stores.

Factor 1 included clerk-typists and production managers with both sales and office duties. Assistant managers or persons with their responsibilities were again called production managers. Factor 2 included service workers with occupational responsibilities connected to the operation and maintenance of equipment. Occupational titles in Factor 3 were named manager. The service worker group of Factor 4 contained more semi-skilled occupational titles than the service worker group in Factor 2.

Table 4 shows the factored clusters for 11 occupational titles from 63 persons in thirteen independent stores at the _To Advance_ level. Occupational titles in Factor 1 were named sales and office worker.

Table 3. Occupational Title Factor Analysis of Competency Ratings for To Enter for 63 Persons in 11 Occupational Titles in Thirteen Independent Agricultural Supplies Stores

Occupational Title Group Occupational Title	Rotated Factor Loading
Factor 1 Sales and Office Worker	
Clerk-typist	.84
Clerk-typist	.82
Production manager	.80
Clerk-typist	.76
Clerk-typist	.73
Clerk-typist	.69
Store manager	.66
Production manager	.66
Clerk-typist	.63
Store manager	.63
Bookkeeper	.62
Production manager	.62
Store manager	.61
Salesman	.55
Production manager	.55
Sales clerk	.54
Sales manager	.54
Production manager	.53
Factor 2 Service Worker (Equipment)	
Laborer	.81
Stationary mill operator	.78
Truck driver	.78
Mobile mill operator	.76
Laborer	.75
Truck driver	.72
Stationary mill operator	.59
Truck driver	.59
Truck driver	.56
Factor 3 Manager	
Store manager	.72
Production manager	.68

Table 3. continued

Occupational Title Group Occupational Title	Rotated Factor Loading
Factor 3 Manager - continued	
Store manager	.66
Store manager	.63
Production manager	.62
Store manager	.61
Store manager	.61
Salesman	.59
Production manager	.57
Factor 4 Service Worker	
Truck driver	.57
Salesman	.51
Truck driver	.49
Truck driver	.49
Truck driver	.49
Truck driver	.40
Laborer	.36
Truck driver	.36

Table 4. Occupational Title Factor Analysis of Competency Rating for To Advance for 63 Persons in 11 Occupational Titles in Thirteen Independent Agricultural Supplies Stores

Occupational Title Group Occupational Title	Rotated Factor Loading
Factor 1 Sales and Office Worker	
Bookkeeper	-.75
Clerk-typist	-.73
Clerk-typist	-.66
Clerk-typist	-.62
Sales manager	-.60
Clerk-typist	-.58
Clerk-typist	-.52
Clerk-typist	-.48
Factor 2 Service Worker (Equipment)	
Truck driver	.82
Truck driver	.73
Stationary mill operator	.70
Stationary mill operator	.70
Laborer	.69
Stationary mill operator	.68
Mobile mill operator	.68
Laborer	.67
Laborer	.66
Truck driver	.64
Truck driver	.59
Stationary mill operator	.58
Stationary mill operator	.54
Factor 3 Manager	
Production manager	.83
Production manager	.81
Store manager	.71
Store manager	.70
Store manager	.69
Store manager	.68
Store manager	.67
Production manager	.65

Table 4. continued

Occupational Title Group Occupational Title	Rotated Factor Loading
Factor 3 Manager - continued	
Store manager	.63
Production manager	.63
Production manager	.63
Store manager	.62
Store manager	.62
Store manager	.62
Store manager	.61
Factor 4 Service Worker	
Truck driver	-.75
Truck driver	-.68
Truck driver	-.57
Production manager	-.43
Clerk-typist	-.43
Truck driver	-.40

Factor 2 included service workers who had responsibility for the operation and maintenance of equipment and Factor 4 included service workers who had less responsibility with equipment. Factor 3 included managers. The distinctiveness of occupational titles factored for each type of store gives support to the hypothesis that there are meaningful occupational title groups at the _To Enter_ and _To Advance_ levels in coöperative and in independent agricultural supplies stores. The factors are important because they can be used in the development of occupational training programs. Theoretically, all occupational titles in one factor could be served by the same training program.

Factor Analysis of Competencies

Hypothesis 2, there are meaningful competency factor groups at the _To Enter_ and _To Advance_ levels in the two types of agricultural supplies stores, was accepted as shown by data in Table 5 and Appendix B.

Factor analysis with varimax rotation was set for eight, ten, and twelve factors to furnish more information for correctly interpreting results. It was found that the program set for eight factors resulted in the most clear-cut grouping of competencies for both _To Enter_ and _To Advance_. Factor loadings from the programs set for ten and twelve factors were lower and competencies which were significant tended to have less relationship to one another. The eight competency factors, the competency, and rotated factor loading for _To Enter_ and _To Advance_ for two types of stores are presented in Appendix B.

Table 5 aids in understanding the competency factors and competency factor groups by summarizing competency factors clustered for To Enter and To Advance levels for occupational titles in two types of stores. The data indicate that three agricultural competency factors and three business competency factors were clustered for To Enter and To Advance for both types of stores. These six groupings of commonalities among competencies should serve as major considerations in the development of training programs for occupations in agricultural supplies.

Repair and maintenance of facilities and equipment appeared as a factor at the To Enter level for both types of stores and at the To Advance level for independent agricultural supplies stores. Sales skills appeared as a separate factor at the To Enter and To Advance levels for independent agricultural supplies stores. Sales competency factors for cooperative agricultural supplies stores were in the feed and seed sales and service factor at the To Enter level and with the chemical and equipment sales and service factor at the To Advance level. Factoring does not always produce clear-cut groupings and a study of competency factors in Appendix B will indicate that several sales competencies are also included in Factors 6, 7, and 8.

Employer-employee relations appeared as a separate factor at the To Advance level for cooperative agricultural supplies stores. A study of Appendix B indicates competencies pertaining to employer-employee relations. These competencies are included in Factor 7.

Table 5. Summary of the Competency Factors Clustered for To Enter and To Advance Levels for Occupational Titles in Cooperative and in Independent Agricultural Supplies Stores

Competency Factor Group	Cooperative Stores		Independent Stores	
Competency Factor	Enter	Advance	Enter	Advance
Agricultural Competencies				
Plant Science (chemicals, fertilizers, seeds)	X	X	X	X
Agricultural Mechanics (structures, materials, power, equipment)	X	X	X	X
Animal Science (livestock feeds, nutrition, health)	X	X	X	X
Repair and Maintenance of Facilities and Equipment	X		X	X
Feed and Seed Sales and Service	X			
Chemical and Equipment Sales and Service		X		
Business Competencies				
Business Management and Economics	X	X	X	X
Employee Traits and Job Responsibilities	X	X	X	X
Office Skills and Practices	X	X	X	X
Employer-Employee Relations		X		
Sales Skills			X	X

The most interesting finding indicated in Table 5 is that factor analysis clustered more agricultural competency factors than business competency factors in the To Enter level for cooperative agricultural supplies stores. This would indicate that persons entering occupations in cooperative agricultural supplies stores need broader training in agriculture.

Table 5 and Appendix B give sustenance to the hypothesis that there are meaningful competency factor groups at the To Enter and To Advance levels in the two types of agricultural supplies stores.

Differences in Levels of Competency Needed To Enter and To Advance

A more detailed analysis of the competencies needed by occupational groups was calculated in descriptive rating terms of low, medium, and high. Averages of the competencies in each competency factor were computed for the occupational titles in each occupational title group. Competency factor averages were then summed and divided by the number of competencies in each competency factor to obtain the competency factor score for each occupational title group. The grand mean and standard deviation of the competency factor scores were calculated and levels of competency needed for To Enter and To Advance were then computed by taking one-half of one grand standard deviation from the competency factor score mean. The grand mean was 2.1 and the standard deviation was .45. Competency factor scores which fell within one-half of one standard deviation from the grand mean were classified as medium. Competency factor scores above and below the medium range were classified as high and low respectively. The means and standard deviations of To Enter and To Advance competency factors used in computation of the grand mean and standard deviation are shown in Table 6.

Means for To Enter were equal in both types of stores. The To Advance mean for cooperative stores was higher than the To Enter mean for independent stores. Standard deviations of To Enter and To Advance competency factor scores were nearly identical for cooperative stores. This indicates that the dispersity of interview ratings were practically equal for both levels. Standard deviations for the independent stores indicate that interview ratings for To Advance had a greater dispersion than ratings for To Enter.

Hypothesis 3, the level of competency needed To Advance is higher than To Enter for occupational title groups in the two types of agricultural supplies stores, was accepted as shown by data in Appendix C and Tables 7, 8, 9, and 10.

Table 7 shows the levels of competency needed for To Enter for occupational title groups in cooperative agricultural supplies stores. The occupational title group of service worker needed high levels of competency in the competency factors of repair and maintenance of facilities and equipment, and employee traits and job responsibilities. Medium levels of competency were needed in the competency factors of animal science (livestock feeds, nutrition, health), feed and seed sales and service, business management and economics, and office skills and practices. Low levels of

Table 6. Means and Standard Deviations of the Competency Factor Scores _To Enter_ and _To Advance_ in Occupations in Cooperative and in Independent Agricultural Supplies Stores

	To Enter		To Advance	
Store Type	Mean	Standard Deviation	Mean	Standard Deviation
Cooperative	1.89	.46	2.45	.47
Independent	1.87	.39	2.21	.50

Table 7. Ratings of Competencies Needed by Occupational Title Groups at the To Enter Level for Fifteen Occupational Titles in Ten Cooperative Agricultural Supplies Stores

Competency Factor Group Competency Factor	Competency Ratings by Occupational Groups Service Worker	 Salesman	 Office Worker	 Manager
Agricultural Competencies				
Plant Science (chemicals, fertilizers, seeds)	Low	Med.	Low	Med.
Agricultural Mechanics (structures, materials, power, equipment)	Low	Low	Low	Low
Animal Science (livestock feeds, nutrition, health)	Med.	Med.	Low	Med.
Repair and Maintenance of Facilities and Equipment	High	Low	Low	Med.
Feed and Seed Sales and Service	Med.	Med.	Low	Med.
Business Competencies				
Business Management and Economics	Med.	Low	Low	High
Employee Traits and Job Responsibilities	High	High	Med.	High
Office Skills and Practices	Med.	Low	Med.	Med.

competency were needed in the competency factors of plant science (chemicals, fertilizers, seeds), and agricultural mechanics (structures, materials, power, equipment).

The occupational title group of salesman needed a high level of competency in the competency factor of employee traits and job responsibilities. Medium levels of competency were needed in the competency factors of plant science, animal science, and feed and seed sales and service. Low levels of competency were needed in the competency factors of agricultural mechanics, repair and maintenance of facilities and equipment, business management and economics, and office skills and practices.

Office workers needed medium levels of competency in the competency factors of employee traits and job responsibilities, and office skills and practices. Low levels of competency were needed in competency factors: plant science, agricultural mechanics, animal science, repair and maintenance of facilities and equipment, feed and seed sales and service, and business management and economics. There were no competency factors indicating a need for high levels of competency.

Managers needed high levels of competency in the competency factors of business management and economics, and employee traits and job responsibilities. Medium levels of competency were needed in the competency factors of plant science, animal science, repair and maintenance of facilities and equipment, feed and seed sales and service, and office skills and practices. A low level of competency was needed in the competency factor of agricultural mechanics.

Survey schedule competencies selected to represent small equipment and services were low in the competency factor of agricultural mechanics for all occupational title groups. Some of the mechanics competencies factored with the competency factor of repair and maintenance of facilities and equipment. A possible explanation of the low To Enter agricultural mechanics competency factor is that cooperative agricultural supplies stores were visited regularly by a regional specialist in agricultural mechanics. The specialist relieved employees of responsibility for a high level of competency in this area.

Table 8 shows the levels of competency needed for To Advance for occupational title groups in cooperative agricultural supplies stores. The occupational title group of service worker needed high levels of competency in the competency factors of agricultural mechanics (structures, materials, power, equipment), animal science (livestock feeds, nutrition, health), employer-employee relations, and office skills and practices in addition to the high level in the competency factor of employee traits and job responsibilities required for entry. Medium levels of competency were needed in the competency factors of plant science (chemicals, fertilizers, seeds), and chemical and equipment sales and service in addition to the medium level needed in the competency factor of business management and economics required for To Enter.

Table 8. Ratings of Competencies Needed by Occupational Title Groups at the To Advance Level for Fifteen Occupational Titles in Ten Cooperative Agricultural Supplies Stores

Competency Factor Group	Competency Ratings by Occupational Groups			
Competency Factor	Service Worker	Salesman	Office Worker	Manager
Agricultural Competencies				
Plant Science (chemicals, fertilizers, seeds)	Med.*	High*	Low	High*
Agricultural Mechanics (structures, materials, power, equipment)	High*	High*	Low	Med.*
Animal Science (livestock feeds, nutrition, health)	High*	High*	Low	High*
Chemical and Equipment Sales and Service	Med.*	High*	Low	High*
Business Competencies				
Employer-Employee Relations	High*	High*	High*	High*
Business Management and Economics	Med.	High*	High*	High
Employee Traits and Job Responsibilities	High	High	High*	High
Office Skills and Practices	High*	High*	High*	High

*Levels of competencies needed increased from To Enter to To Advance.

The occupational title group of salesman needed a high level of competency in all of the competency factors.

Office workers needed high levels of competency in competency factors: employer-employee relations, business management and economics, employer traits and job responsibilities, and office skills and practices. Low levels of competency were needed in the remaining competency factors.

Managers needed high levels of competency in the competency factors of plant science, animal science, chemical and equipment sales and service, employer-employee relations, and office skills and practices in addition to those competency factors that required a high level of competency for entry. A medium level of competency was needed in the competency factor of agricultural mechanics.

All occupational title groups for To Advance required high levels of competency in the competency factors of employer-employee relations, employee traits and job responsibilities, and office skills and practices.

The occupational title group of manager required the highest level of competency by competency factors for To Enter and the occupational title group of salesman required the highest level of competency by competency factors for To Advance.

Table 9 shows the levels of competency needed for To Enter for occupational title groups in independent agricultural supplies stores. The occupational title group of sales and office worker needed a high level of competency in the competency factor of office skills

Table 9. Ratings of Competencies Needed by Occupational Title Groups at the To Enter Level for 11 Occupational Titles in Thirteen Independent Agricultural Supplies Stores

Competency Factor Group Competency Factor	Competency Ratings by Occupational Groups Sales and Office Worker	Service Worker (Equipment)	Manager	Service Worker
Agricultural Competencies				
Plant Science (chemicals, fertilizers, seeds)	Low	Low	Med.	Med.
Agricultural Mechanics (structures, materials, power, equipment)	Low	Low	Low	Low
Animal Science (livestock feeds, nutrition, health)	Low	Low	High	Low
Repair and Maintenance of Facilities and Equipment	Low	Med.	Med.	Low
Business Competencies				
Sales Skills	Med.	Low	Med.	Med.
Business Management and Economics	Med.	Low	Med.	Low
Employee Traits and Job Responsibilities	Med.	Med.	Med.	Med.
Office Skills and Practices	High	Low	High	Med.

and practices, and medium levels of competency in the competency factors of sales skills, business management and economics, and employee traits and job responsibilities. Low levels of competency were needed in the agricultural competency factor group.

The occupational title group of service worker (equipment) needed medium levels of competency in the competency factors of repair and maintenance of facilities and equipment, and employee traits and job responsibilities. Low levels of competency were needed in competency factors: plant science (chemicals, fertilizers, seeds), agricultural mechanics (structures, materials, power, equipment), animal science (livestock feeds, nutrition, health), sales skills, business management and economics, and office skills and practices. There were no competency factors indicating a need for high levels of competency.

Managers needed high levels of competency in the competency factors of animal science, and office skills and practices. Medium levels of competency were needed in competency factors: plant science, repair and maintenance of facilities and equipment, sales skills, business management and economics, and employee traits and job responsibilities. A low level of competency was needed in the competency factor of agricultural mechanics.

Service workers needed medium levels of competency in the competency factors of plant science, sales skills, employee traits and job responsibilities, and office skills and practices. Low levels of competency were needed in competency factors: agricultural mechanics, animal science, repair and maintenance of facilities and equipment, and business management and economics. There were no competency factors indicating a need for high levels of competency.

Table 10 shows the levels of competency needed for To Advance for occupational title groups in independent agricultural supplies stores. The occupational title group of sales and office worker needed high levels of competency in the competency factors of sales skills, and employee traits and job responsibilities in addition to the high level in the employee traits and job responsibilities competency factor required for entry. A medium level of competency was needed in the competency factor of business management and economics. The remaining competency factors for the occupational title group of sales and office worker remained the same for To Advance as for To Enter.

The occupational title group of service worker (equipment) needed a high level of competency in the competency factor of employee traits and job responsibilities. Medium levels of competency were needed in competency factors: animal science, sales skills, and business management and economics. The remaining competency factors for the occupational title group of service worker (equipment) remained the same for To Advance as for To Enter.

Managers needed high levels of competency in the competency factors of plant science, sales skills, business management and economics, and employee traits and job responsibilities in addition to the high levels

Table 10. Ratings of Competencies Needed by Occupational Title Groups at the To Advance Level for 11 Occupational Titles in Thirteen Independent Agricultural Supplies Stores

Competency Factor Group	Competency Ratings by Occupational Groups			
Competency Factor	Sales and Office Worker	Service Worker (Equipment)	Manager	Service Worker
Agricultural Competencies				
Plant Science (chemicals, fertilizers, seeds)	Low	Low	High*	High*
Agricultural Mechanics (structures, materials, power, equipment)	Low	Low	Low	Low
Animal Science (livestock feeds, nutrition, health)	Low	Med.*	High	High*
Repair and Maintenance of Facilities and Equipment	Low	Med.	Med.	Med.*
Business Competencies				
Sales Skills	High*	Med.*	High*	High*
Business Management and Economics	Med.	Med.*	High*	Med.*
Employee Traits and Job Responsibilities	High*	High*	High*	High*
Office Skills and Practices	High	Low	High	Med.

*Levels of competencies needed increased from To Enter to To Advance.

required for entry. The remaining competency factors remained the same for To Advance as for To Enter.

Service workers needed high levels of competency in the competency factors of plant science, animal science, sales skills, and employee traits and job responsibilities. Medium levels of competency were needed in the competency factors of repair and maintenance of facilities and equipment, and business management and economics. The remaining competency factors remained the same for To Advance as for To Enter.

All occupational title groups for To Advance required high levels of competency in the competency factor of employee traits and job responsibilities.

Managers required the highest level of competency by competency factors for To Enter and for To Advance. The occupational title group of service worker required the lowest level of competency by competency factor for To Enter and for To Advance.

The data in Tables 7, 8, 9, and 10 and Appendix C support the conclusion to accept Hypothesis 3 in that the level of competency needed To Advance is higher than To Enter for occupational title groups in the two types of agricultural supplies stores.

Competency Factors Most Needed by Occupational Title Groups

In summary, the major competency factors and their relative importance to occupational title groups were:

Competency Factor	Summary
Plant Science (chemicals, fertilizers, seeds)	Needed by managers, salesman and service workers at To Advance for both types of stores.
Agricultural Mechanics (structures, materials, power, equipment)	Needed by service workers and salesman at To Advance for cooperative agricultural supplies stores.
Animal Science (livestock feeds, nutrition, health)	Needed by managers at To Enter and needed by managers, service workers, and salesman at To Advance for both types of stores.
Repair and Maintenance of Facilities and Equipment	Needed by managers at To Enter for cooperative agricultural supplies stores and needed by service workers at To Advance for independent agricultural supplies stores.
Feed and Seed Sales and Service	Needed by managers at To Enter for cooperative agricultural supplies stores.
Chemical and Equipment Sales and Service	Needed by managers and salesman at To Advance for cooperative agricultural supplies stores.
Business Management and Economics	Needed by managers at To Enter and To Advance for both types of stores and needed by salesman and office worker at To Advance for cooperative agricultural supplies stores.
Employee Traits and Job Responsibilities	Needed by managers, salesman, and service workers at To Enter for

	cooperative agricultural supplies stores and needed by all occupational title groups at To Advance for both types of stores.
Office Skills and Practices	Needed by sales and office workers, and managers at To Enter for independent agricultural supplies stores and needed by managers, office workers, and salesman at To Advance for both types of stores.
Employer-Employee Relations	Needed by all occupational title groups at To Advance for cooperative agricultural supplies stores.
Sales Skills	Needed by managers, office and sales workers, and service workers at To Advance for independent agricultural supplies stores.

Most Desirable Experience Background for Occupations in Agricultural Supplies

Hypothesis 4, there are differences in experience background preferred for occupations in the two types of agricultural supplies stores, was accepted as shown in Table 11.

Table 11 shows that 79 per cent of the interviewees in cooperative agricultural supplies stores and 78 per cent of the interviewees in independent agricultural supplies stores indicated a farm background was most desirable for occupations in agricultural supplies stores. A rural non-farm background was indicated as being most

Table 11. Experience Background Most Desirable for Employment in Agricultural Supplies Stores as Indicated by 63 Persons in Thirteen Independent Agricultural Supplies Stores and by 95 Persons in Ten Cooperative Agricultural Supplies Stores

		Per Cent of Persons Indicating Most Desirable Experience Background			
Store Type	Number of Persons	Farm	Rural Non-farm	Urban	No Preference
Cooperative	95	79	6	0	15
Independent	63	78	13	0	9

desirable for occupations in agricultural supplies stores by 6 per cent of the interviewees in cooperative agricultural supplies stores and by 13 per cent of interviewees in independent agricultural supplies stores. Fifteen per cent of the interviewees in cooperative agricultural supplies stores and 9 per cent of the interviewees from independent agricultural supplies stores indicated no preference. There were no interviewees indicating urban as being most desirable for occupations in agricultural supplies stores.

The majority of interviewees who checked rural non-farm or no preference were in the occupational title group of office worker. Bookkeepers in both types of stores and clerk-typists in both types of large agricultural supplies stores often had occupational duties which required minimum knowledge of farming. However, the findings do indicate that vocational agriculture students and/or persons with farm backgrounds have more opportunity for employment than do persons without a farm background.

The preceding evidence supports the conclusion to accept Hypothesis 4 in that there are differences in experience background preferred for occupations in the two types of agricultural supplies stores.

Types of In-Service Education Provided Employees of Agricultural Supplies Stores

Hypothesis 5, there are differences in in-service education being provided employees of the two types of agricultural supplies stores, was accepted. Store managers of ten cooperative agricultural supplies stores and store managers of thirteen independent agricultural supplies stores indicated the type, amount, and source of in-service education being provided their employees.

The type, amount, and source of in-service education for cooperative agricultural supplies stores were found not to be the same as the type, amount, and source of in-service education for independent agricultural supplies stores.

Store managers of cooperative agricultural supplies stores indicated that regional specialists in agricultural mechanics, livestock feeds, fertilizer, seed, and agricultural chemicals held formal product knowledge and sales skills classes at intervals throughout the entire year and usually gave informal instruction during their weekly, bi-weekly, or monthly visits. Employees were also found to be receiving on-the-job training from the store manager and/or production manager. Various employees were sent to special product knowledge and sales skills courses conducted by the cooperative stores headquarters. The special courses ranged in length from one day for truck drivers to a week or several weeks for managers, fieldman, and salesman. Employees were also encouraged to attend cooperative extension meetings that were pertinent to their occupational duties. The type, amount, and source of in-service education of cooperative agricultural supplies stores did not vary with the size of store.

Store managers of independent agricultural supplies stores indicated that employees received all of their instruction from on-the-job training or representatives from wholesale suppliers. The in-service education was more seasonal, and of a lesser amount than for cooperative agricultural supplies stores. Also, the larger independent agricultural supplies stores were found to be providing more in-servie education than the smaller independent agricultural supplies stores.

The different types, amounts, and sources of in-service education give support to the hypothesis that there are differences in in-service education being provided employees of the two types of agricultural supplies stores.

Discussion of Interview Observations

This study differed from previous studies of determining competencies for occupational titles in three respects: 1) the investigator made all of the personal inverviews and secured all of the data for the study; 2) the traditional method of obtaining occupational data by interviewing employers was supplanted by a method of interviewing employees in the occupational titles; and 3) the occupational titles are in the Dictionary of Occupational Titles, third edition (5).

All employers were found to be very cooperative once they understood the nature and purpose of the survey schedule. Although stores were at the height of their busiest season, all store managers attempted to arrange that interviews could be held with all employees. All interviewees were "put at ease" by an informal explanation of the survey schedule and purpose of the study. Interviewees were prompt in their responses and in some instances would express thoughts on certain competencies important to their particular job.

Upon completing the interview, all persons were asked about competencies necessary to their occupational titles but not included in the survey schedule. A typical employee reaction was: "No, it seemed to pretty well cover everything." A store manager's typical reaction was: "Find me a man that's high on all these items and I'll hire him." Competencies which store managers felt important and not included on the survey schedule were: knowledge of and a close working relationship with Cooperative Extension and Vocational Agriculture, knowledge of complex financial arrangements, and ability to keep abreast of technological advancements through critical reading and evaluation of literature. Store managers felt that responsibility, willingness to work and learn, proper attitude, and "the ability to get along with people" were the most important qualities they looked for in prospective employees.

Numerous store managers mentioned that it was becoming extremely difficult to obtain competent men. This ranged all the way from production managers, and maintenance mechanics to truck drivers. During the course of a conversation certain store managers admitted that the major source of difficulty for this problem was a low salary. Several store managers indicated they had started paying more and several indicated they would have to start paying more to "keep" and "get" good men.

A question the investigator asked whenever the pattern of a conversation permitted was "Would you hire a young man who had received one or two years of special training?" The answer to this question was always related to the size of business. Store managers of larger agricultural supplies stores indicated they would whereas store managers of smaller agricultural supplies stores indicated they would not. The reason the latter gave was "The small mark-up on a small volume prevents me from paying the higher salary." Upon further questioning however, all emphasized, "Give me a boy with a solid farm background and a knowledge of agriculture and I'll train him on the job."

Store managers also expressed interest in occupational experience programs. An interesting point made by several managers who had participated in placement programs was that students should be allowed to work a full day during the part of the year they were most needed. During the spring a student would see the store at its peak operation and have more opportunity to gain attitudes, understandings, and skills by actually experiencing certain situations and accepting more responsibility. This observation should be given serious consideration by schools offering or developing placement programs. Three month summer occupational experience programs might have greater value if given during the spring.

When asked if employees needed additional training, all store managers answered in the affirmative. They indicated a need existed for agricultural technology courses in the areas of agricultural chemicals, fertilizers, and livestock feeds. They also indicated that there was a particular need for installation and service men trained in agricultural mechanics.

None of the managers interviewed indicated that their employees were receiving instruction from adult classes of high school vocational agriculture departments. They expressed hopes that courses would be offered in adult education classes or the emerging area vocational-technical schools.

CHAPTER V

SUMMARY AND CONCLUSIONS

Statement of the Problem

The purposes of this study were: 1) to identify and cluster occupational titles at the To Enter and To Advance levels of performance and to determine commonalities among occupational titles in two types of agricultural supplies stores; 2) to identify, rate, and cluster groups of competencies at the To Enter and To Advance level for occupations in two types of agricultural supplies stores; 3) to determine whether there are differences in levels of competency needed for total, and by agricultural and business competency groups, in two types of stores analyzed separately from To Enter to To Advance for occupational title groups; 4) to determine the experience background preferred for occupations in agricultural supplies stores; and 5) to determine the type of in-service education being provided employees of agricultural supplies stores.

The hypotheses were stated in a positive manner to facilitate appropriate statistical treatments. The major hypotheses were:

1. There are meaningful occupational title groups at the To Enter and To Advance levels in cooperative and in independent agricultural supplies stores.

2. There are meaningful competency factor groups at the To Enter and To Advance levels in the two

types of agricultural supplies stores.

3. The level of competency needed To Advance is higher than To Enter for occupational title groups in the two types of agricultural supplies stores.

4. There are differences in experience background preferred for occupations in the two types of agricultural supplies stores.

5. There are differences in in-service education being provided employees of the two types of agricultural supplies stores.

Procedure

An interview schedule was developed to collect data. It was developed through a critical review of literature and revised after being reviewed by selected individuals at The Pennsylvania State University who were well acquainted with each subject matter area in agricultural supplies and services. It was tested in a pilot study and revised to include more competencies in the services aspect of agricultural supplies businesses. The final survey schedule included thirty nine agricultural competencies and twenty eight business competencies. The schedule was designed so that employees interviewed could respond to the importance of each competency for entering their occupational title and for advancing in it. Their responses consisted of indicating whether the level of competency needed was low, medium, or high. Respectively assigned response values of one, two, and three were used in the statistical calculations. The fifteen occupational titles included in the study were obtained from the Dictionary of Occupational Titles, third edition (5).

Agricultural supplies stores selected for the study were of two distinctly different types. One type was an independently owned store and the other type was a cooperative store owned by shareholders and/or farmers. Ten cooperative agricultural supplies stores and thirteen independent agricultural supplies stores were selected from all sections of the state in such a manner that numbers of stores with low, medium, and high numbers of employees were about equal.

Managers of stores selected for the study were informed of the project through a personal letter. Telephone calls were made to arrange a time and date for the interviews. All interviews were conducted by the investigator. Data were collected from 95 persons in ten cooperative agricultural supplies stores and from 63 persons in thirteen independent agricultural supplies stores.

Data were coded and punched on IBM cards for processing at The Pennsylvania State University Computation Center. Competencies and occupational titles were analyzed by factor analysis with varimax rotation.

Summary

Hypothesis 1. There are meaningful occupational title groups at the To Enter and To Advance levels in cooperative and in independent agricultural supplies stores. The hypothesis was accepted on the basis of the occupational title groups that factored at the

To Enter and To Advance levels for both types of agricultural supplies stores. Occupational title groups that factored at the To Enter and To Advance levels for cooperative agricultural supplies stores were: service worker, salesman, office worker, and manager. Occupational title groups that factored at the To Enter and To Advance level for independent agricultural supplies stores were: sales and office worker, service worker (equipment), manager, and service worker. Occupational titles of service manager, maintenance mechanic, fieldman, and office manager were not found in the thirteen independent agricultural supplies stores selected for this study.

Hypothesis 2. There are meaningful competency factor groups at the To Enter and To Advance levels in the two types of agricultural supplies stores. The hypothesis was accepted on the basis of the competency factors that grouped at the To Enter and To Advance level for both types of agricultural supplies stores. Agricultural competency factors that grouped at the To Enter and To Advance level for both types of agricultural supplies stores were: plant science (chemicals, fertilizers, seeds), agricultural mechanics (structures, materials, power, equipment), and animal science (livestock feeds, nutrition, health). Business competency factors that grouped at the To Enter and To Advance level for both types of agricultural supplies stores were: business management and economics, employee traits and job responsibilities, and office skills and practices.

Hypothesis 3. The level of competency needed To Advance is higher than To Enter for occupational title groups in the two types of agricultural supplies stores. The hypothesis was accepted for the occupational title groups of service worker, salesman, office worker, and manager for cooperative agricultural supplies stores and for the occupational title groups of sales and office worker, service worker (equipment), manager, and service worker for independent agricultural supplies stores.

Hypothesis 4. There are differences in experience background preferred for occupations in the two types of agricultural supplies stores. The hypothesis was accepted. Seventy nine per cent of the interviewees in cooperative agricultural supplies stores and 78 per cent of the interviewees in independent agricultural supplies stores indicated that a farm background was most desirable for occupations in agricultural supplies stores.

Hypothesis 5. There are differences in in-service education being provided employees of the two types of agricultural supplies stores. The hypothesis was accepted. The type, amount, and source of in-service education were found not to be the same as the type, amount, and source of in-service education for independent agricultural supplies stores. Employees of cooperative agricultural supplies stores were found to be receiving a greater amount and a more formalized type of education than employees of independent agricultural supplies stores.

Conclusions and Implications

The findings of the study indicated that there were meaningful occupational title groups of service worker, salesman, office worker, manager, sales and office worker, and service worker (equipment). Knowledge of the groups could be important in the development of guidance materials and/or occupational training programs in high schools or in post high school programs since all occupational titles in each group could be served by the same materials and/or training program.

Each type of agricultural supplies store had six meaningful competency factors clustered for the To Enter and To Advance levels. Five other competency factors appeared for the different stores at either the To Enter or To Advance level. The groupings of commonalities among competencies could serve as a guide for high school or post high school program planning and development of instructional materials for educational programs in agricultural supplies.

Occupational advancement in agricultural supplies required additional training in agricultural and business competencies for all occupational titles studied. The competency factors and competency factor scores for each occupational title should be considered in the development of training programs for persons entering an occupation and/or seeking advancement in their occupation. Also, teachers of agriculture should teach business education subject matter and/or work cooperatively with business education departments.

Seventy nine per cent of the interviewees in the cooperative stores and 78 per cent of the interviewees in the independent stores indicated that a farm background was most desirable for occupations in agricultural supplies stores. Vocational agriculture students and persons with farm experience have opportunities for occupations in agricultural supplies.

In-service education being offered to employees of agricultural supplies stores was found to vary with size and type of store. Store managers indicated that employees need additional in-service training programs to aid them in acquiring the competencies needed for occupational advancement. Vocational agriculture teachers have the opportunity to provide adult education classes and could consider the work that has been done in this study in determining what competencies should be taught.

Recommendations

Recommendations which appear to be pertinent include the following:

1. That studies be conducted in the area of occupational experience programs in agricultural supplies stores.
2. That further study be conducted to determine needed competencies in the service area of agricultural supplies.
3. That further study be conducted to determine agricultural mechanics competencies needed by installation and service men in agricultural supplies stores.
4. That studies be conducted to determine needed competencies for occupations in agricultural supplies

stores located in the highly urbanized areas of the state.

5. That high school vocational agriculture departments and post high school institutions develop adult education programs for employment in the area of agricultural supplies.

6. That supporting education in business and office, and distributive areas be given more emphasis in developing the business competencies required for employment in agricultural businesses.

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APPENDIX A

Interview Schedule

Pennsylvania State Study Date of Interview________
Agricultural Supplies

AN ANALYSIS OF OCCUPATIONAL TITLES AND COMPETENCIES NEEDED IN OFF-FARM AGRICULTURAL SUPPLIES BUSINESSES

Survey Schedule

I. Identification of Agricultural Supplies Store

A. Name of Business________________ Number__________

B. Address__________________________ County__________

II. Identification of Person Interviewed

A. Name of Person__________________ Number__________

B. Level of Employment________________________________

C. Company Title____________________________________

D. Occupational Title______________ Number__________

E. Alternate Jobs__________________ Study___________

__________________ Study___________

III. Activities and Duties of This Job Title

____

____

IV. Residential and Experience Background (check only one)

_____ 1. Farm _____ 3. Urban

_____ 2. Rural, non-farm _____ 4. No preference

V. Competencies Associated with This Job Title -- Number_________________

Section I - Agricultural Competencies

	Check Degree of Competency Needed					
	To Enter this job			To Advance in this job title		
	Low	Med.	High	Low	Med.	High
Seed						
1. Understand seed tag information	___	___	___	___	___	___
2. Knowledge of seed certification requirements and organizations	___	___	___	___	___	___
3. Understand seed inventory management and quality seed storage	___	___	___	___	___	___
4. Understand and perform seed treatment and inoculation	___	___	___	___	___	___
5. Understand seed production and germination	___	___	___	___	___	___
6. Recommend seeds for local conditions . .	___	___	___	___	___	___
7. Understand seeding and management practices for establishment of crops	___	___	___	___	___	___
Fertilizer						
8. Understand principles of plant nutrition and growth	___	___	___	___	___	___
9. Recognize nutritional deficiencies in plants	___	___	___	___	___	___
10. Interpret information from soil tests . . .	___	___	___	___	___	___
11. Recommend fertilizer programs for area crops	___	___	___	___	___	___
12. Handle and apply fertilizers with approved methods and equipment	___	___	___	___	___	___

Section I - continued

	Low	Med.	High	Low	Med.	High
Fertilizer - continued						
13. Knowledge of soil classification and conservation practices	___	___	___	___	___	___
Agricultural Chemicals						
14. Understand laws pertaining to handling,storage, sale, and use of chemicals	___	___	___	___	___	___
15. Store and apply chemicals with approved methods and equipment	___	___	___	___	___	___
16. Identify insects, weeds, plant diseases, and their damage	___	___	___	___	___	___
17. Recommend practices and chemicals to control insects	___	___	___	___	___	___
18. Understand life cycle of weeds, insects, and diseases	___	___	___	___	___	___
19. Recommend practices and chemicals for weed control	___	___	___	___	___	___
20. Recommend chemicals and practices to control animal diseases and parasites	___	___	___	___	___	___
21. Recommend chemicals to control rodents and predators	___	___	___	___	___	___
22. Recommend plant disease control programs . .	___	___	___	___	___	___
Livestock Feeds						
23. Understand feed formula laws and requirements	___	___	___	___	___	___
24. Understand feed formulation and processing procedures	___	___	___	___	___	___

Section I - continued

	Low	Med.	High	Low	Med.	High
Livestock Feeds - continued						
25. Knowledge of convenient, safe, and quality feed storage	___	___	___	___	___	___
26. Understand purposes of different feeds and ingredients	___	___	___	___	___	___
27. Understand feeding management practices for animal and poultry health	___	___	___	___	___	___
28. Plan and coordinate feeding programs . .	___	___	___	___	___	___
29. Recognize and understand abnormal animal and poultry health conditions . .	___	___	___	___	___	___
Other (small equipment)						
30. Understand selection, operation, maintenance and repair of tools, equipment, and machines	___	___	___	___	___	___
31. Understand small engines, repair and maintenance	___	___	___	___	___	___
32. Understand, select, repair, maintain, and service electric motors and equipment	___	___	___	___	___	___
33. Recommend and service automated materials handling equipment .	___	___	___	___	___	___
34. Interpret sketches, drawings, and blueprints	___	___	___	___	___	___
35. Recommend building materials	___	___	___	___	___	___
36. Plan and recommend efficient farm buildings	___	___	___	___	___	___

Section I - continued

	Low	Med.	High	Low	Med.	High
Other (small equipment)- continued						
37. Recommend heating, ventilation, and refrigeration equipment	___	___	___	___	___	___
38. Recommend petroleum products	___	___	___	___	___	___
39. Recommend auto and tractor supplies	___	___	___	___	___	___

List other agricultural competencies that are needed for this job title

____

____

Section II - Business Competencies

	Check Degree of Competency Needed					
	To Enter this job			To Advance in this job title		
	Low	Med.	High	Low	Med.	High
Business Responsibilities						
40. Maintain a cooperative spirit and sense of loyalty	___	___	___	___	___	___
41. Be informed of policies relating to the business	___	___	___	___	___	___
42. Be alert to new business opportunities	___	___	___	___	___	___
43. Read and interpret trade journals	___	___	___	___	___	___
44. Use proper business nomenclature and terms	___	___	___	___	___	___
45. Keep public informed of products and services	___	___	___	___	___	___

Section II - continued

	Low	Med.	High	Low	Med.	High
Business Responsibilities - continued						
46. Ability to plan and schedule work	___	___	___	___	___	___
47. Respect and promote safe operating practices	___	___	___	___	___	___
Sales and Business Skills						
48. Ability to record and compute a sales order	___	___	___	___	___	___
49. Promote sales and set up displays	___	___	___	___	___	___
50. Be alert to satisfying customer needs	___	___	___	___	___	___
51. Aid farmers in arranging credit . .	___	___	___	___	___	___
Management Functions and Economics						
52. Supervise workers and coordinate activities	___	___	___	___	___	___
53. Delegate responsibility and authority	___	___	___	___	___	___
54. Orient new workers to business duties . . .	___	___	___	___	___	___
55. Determine prices based on markets, grade, transportation costs, and overhead	___	___	___	___	___	___
56. Understand the principles of marketing	___	___	___	___	___	___
57. Plan economical transportation, processing, and handling operations	___	___	___	___	___	___
58. Maintain complete and accurate records . .	___	___	___	___	___	___
59. Analyze business records and financial statements	___	___	___	___	___	___

Section II - continued

	Low	Med.	High	Low	Med.	High
Management Functions and Economics - continued						
60. Manage inventory, stock control, and warehousing	___	___	___	___	___	___
61. Understand worker welfare	___	___	___	___	___	___
62. Provide products and services for farmers based upon a sound financial program . .	___	___	___	___	___	___
Facilities and Equipment						
63. Operate business machines	___	___	___	___	___	___
64. Understand technical manuals and operating instructions	___	___	___	___	___	___
65. Operate, maintain, adjust, and repair mill machinery and equipment	___	___	___	___	___	___
66. Operate, manage, and maintain trucks and other distribution equipment	___	___	___	___	___	___
67. Understand the maintenance and repair of storage facilities	___	___	___	___	___	___

List other business competencies that are needed for this job title ________________________________

____

Describe the in-service education for your employees

A) Type ________________________________

B) Amount ________________________________

C) Source ________________________________

APPENDIX B

Competency Factors and Rotated Factor Loadings of Competencies for _To_ _Enter_ and _To_ _Advance_ in Occupations in Cooperative and Independent Agricultural Supplies Stores

B-1. Factor Analysis with Varimax Rotation of Sixty Seven Competencies at the To Enter Level for Fifteen Occupational Titles in Ten Cooperative Agricultural Supplies Stores

Competency Factor Competency	Rotated Factor Loading
Factor 1 Plant Science (chemicals, fertilizers, seeds)	
11 Recommend fertilizer programs for area crops	.84
19 Recommend chemicals for weed control	.81
17 Recommend chemicals to control insects	.80
16 Identify insects, weeds, and plant diseases	.78
6 Recommend seeds for local conditions	.78
10 Interpret information from soil tests	.77
18 Understand life cycle of weeds and insects	.76
15 Store and apply chemicals with approved methods and equipment	.75
13 Knowledge of soil classification and conservation	.74
7 Understand seeding and management practices for establishment of crops	.74
12 Handle and apply fertilizers with approved methods and equipment	.73
21 Recommend chemicals to control rodents and predators	.70
22 Recommend plant disease control programs	.70
20 Recommend chemicals and practices to control animal disease and parasites	.69
14 Understand laws pertaining to chemicals	.68
9 Recognize nutritional deficiencies in plants	.68
2 Knowledge of seed certification requirements	.61
1 Understand seed tag information	.60
8 Understand principles of plant nutrition and growth	.58

B-1. continued

Competency Factor Competency	Rotated Factor Loading
Factor 2 Agricultural Mechanics (structures, materials, power, equipment)	
33 Recommend automated materials handling equipment	-.74
32 Understand electric motors and equipment	-.70
34 Interpret sketches, drawings, and blueprints	-.70
36 Plan and recommend efficient farm buildings	-.68
37 Recommend heating, ventilation, and refrigeration equipment	-.58
35 Recommend building materials	-.56
31 Understand small engine repair and maintenance	-.42
38 Recommend petroleum products	-.35
30 Understand operation and repair of tools, equipment, and machines	-.34
Factor 3 Animal Science (livestock feeds, nutrition, health)	
28 Plan and coordinate feeding programs	-.53
29 Understand animal and poultry health	-.50
27 Understand feeding management practices for animal and poultry health	-.45
Factor 4 Repair and Maintenance of Facilities and Equipment	
66 Operate trucks and other distribution equipment	.81
65 Operate mill machinery and equipment	.80
67 Understand maintenance of facilities	.72
30 Understand operation and repair of tools, equipment, and machines	.67
31 Understand small engine repair and maintenance	.60
25 Knowledge of safe and quality feed storage	.59

B-1. continued

Competency Factor Competency	Rotated Factor Loading
Factor 5 Feed and Seed Sales and Service	
24 Understand feed formulation and processing	.57
5 Understand seed production and germination	.52
4 Understand seed treatment and inoculation	.52
23 Understand feed formula laws and requirements	.50
1 Understand seed tag information	.49
25 Knowledge of safe and quality feed storage	.46
3 Understand seed inventory management	.45
50 Be alert to satisfying customer needs	.42
2 Knowledge of seed certification requirements	.40
8 Understand principles of plant nutrition and growth	.40
26 Understand purposes of different feeds	.37
42 Be alert to new business opportunities	.32
45 Keep public informed of products and services	.32
Factor 6 Business Management and Economics	
52 Supervise workers and coordinate activities	-.84
53 Delegate responsibility and authority	-.80
54 Orient new workers to business duties	-.71
55 Determine prices based on markets, grade, transportation costs, and overhead	-.67
57 Plan economical transportation, processing, and handling operations	-.65
60 Manage inventory, stock control, and warehousing	-.64
59 Analyze business records and financial statements	-.62

B-1. continued

Competency Factor Competency	Rotated Factor Loading
Factor 6 Business Management and Economics - continued	
56 Understand the principles of marketing	-.61
62 Provide products and services for farmers based upon a sound financial program	-.60
51 Aid farmers in arranging credit	-.55
58 Maintain complete and accurate records	-.52
Factor 7 Employee Traits and Job Responsibilities	
40 Maintain a cooperative spirit and sense of loyalty	-.82
41 Be informed of policies relating to the business	-.75
42 Be alert to new business opportunities	-.61
46 Ability to plan and schedule work	-.57
47 Respect and promote safe operating practices	-.50
45 Keep public informed of products and services	-.47
50 Be alert to satisfying customer needs	-.46
44 Use proper business nomenclature and terms	-.45
48 Ability to record and compute a sales order	-.44
58 Maintain complete and accurate records	-.44
Factor 8 Office Skills and Practices	
63 Operate business machines	.73
64 Understand technical manuals	.54
59 Analyze business records and financial statements	.49
61 Understand worker welfare	.48
48 Ability to record and compute a sales order	.41

B-2. Factor Analysis with Varimax Rotation of Sixty Seven Competencies at the To Advance Level for Fifteen Occupational Titles in Ten Cooperative Agricultural Supplies Stores

Competency Factor Competency	Rotated Factor Loading
Factor 1 Plant Science (chemicals, fertilizers, seeds)	
17 Recommend chemicals to control insects	.83
6 Recommend seeds for local conditions	.81
16 Identify insects, weeds, and plant diseases	.81
19 Recommend chemicals for weed control	.80
18 Understand life cycle of weeds and insects	.79
7 Understand seeding and management practices for establihsment of crops	.79
1 Understand seed tag information	.71
12 Handle and apply fertilizers with approved methods and equipment	.71
13 Knowledge of soil classification and conservation	.71
20 Recommend chemicals and practices to control animal diseases and parasites	.71
11 Recommend fertilizer programs for area crops	.70
9 Recognize nutritional deficiencies in plants	.69
10 Interpret information from soil tests	.69
22 Recommend plant disease control programs	.68
8 Understand principles of plant nutrition and growth	.67
Factor 2 Agricultural Mechanics (structures, materials, power, equipment)	
31 Understand small engine repair and maintenance	-.84
32 Understand electric motors and equipment	-.79

B-2. continued

Competency Factor Competency	Rotated Factor Loading
Factor 2 Agricultural Mechanics (structures, materials, power, equipment) - continued	
65 Operate mill machinery and equipment	-.78
33 Recommend automated materials handling equipment	-.77
30 Understand operations and repair of tools, equipment, and machines	-.75
66 Operate trucks and other distribution equipment	-.70
36 Plan and recommend efficient farm buildings	-.64
67 Understand maintenance of facilities	-.63
39 Recommend auto and tractor supplies	-.62
34 Interpret sketches, drawings, and blueprints	-.61
35 Recommend building materials	-.58
38 Recommend petroleum products	-.58
37 Recommend heating, ventilation, and refrigeration equipment	-.57
Factor 3 Animal Science (livestock feeds, nutrition, health)	
24 Understand feed formulation and processing	-.62
25 Knowledge of safe and quality feed storage	-.61
23 Understand feed formula laws and requirements	-.60
26 Understand purposes of different feeds	-.60
4 Understand seed treatment and inoculation	-.44
28 Plan and coordinate feeding programs	-.38
27 Understand feeding management practices for animal and poultry health	-.37

B-2. continued

Competency Factor Competency	Rotated Factor Loading
Factor 4 Chemical and Equipment Sales and Service	
37 Recommend heating, ventilation, and refrigeration equipment	.50
21 Recommend chemicals to control rodents and predators	.42
49 Promote sales and set up displays	.32
20 Recommend chemicals and practices to control animal diseases and parasites	.28
36 Plan and recommend efficient farm buildings	.26
Factor 5 Employer-Employee Relations	
57 Plan economical transportation, processing, and handling operations	.64
47 Respect and promote safe operating practices	.52
54 Orient new workers to business duties	.50
46 Ability to plan and schedule work	.49
52 Supervise workers and coordinate activities	.47
53 Delegate responsibility and authority	.34
Factor 6 Business Management and Economics	
61 Understand worker welfare	.77
59 Analyze business records and financial statements	.75
55 Determine prices based on markets, grade, transportation costs, and overhead	.74
60 Manage inventory, stock control, and warehousing	.60
62 Provide products and services for farmers based upon a sound financial program	.59
53 Delegate responsibility and authority	.56
56 Understand the principles of marketing	.56

B-2. continued

Competency Factor Competency	Rotated Factor Loading
Factor 6 Business Management and Economics - continued	
52 Supervise workers and coordinate activities	.55
51 Aid farmers in arranging credit	.50
Factor 7 Employee Traits and Job Responsibilities	
44 Use proper business nomenclature and terms	-.73
42 Be alert to new business opportunities	-.67
43 Read and interpret trade journals	-.65
51 Aid farmers in arranging credit	-.60
45 Keep public informed of products and services	-.59
46 Ability to plan and schedule work	-.49
50 Be alert to satisfying customer needs	-.46
48 Ability to record and compute a sales order	-.43
Factor 8 Office Skills and Practices	
64 Understand technical manuals	.76
63 Operate business machines	.61
58 Maintain complete and accurate records	.45
59 Analyze business records and financial statements	.36

B-3. Factor Analysis with Varimax Rotation of Sixty Seven Competencies at the To Enter Level for 11 Occupational Titles in Thirteen Independent Agricultural Supplies Stores

Competency Factor	
Competency	Rotated Factor Loading
Factor 1 Plant Science (chemicals, fertilizers, seeds)	
17 Recommend chemicals to control insects	.84
19 Recommend chemicals for weed control	.81
7 Understand seeding and management practices for establishment of crops	.81
10 Interpret information from soil tests	.80
13 Knowledge of soil classification and conservation	.78
11 Recommend fertilizer programs for area crops	.77
9 Recognize nutritional deficiencies in plants	.76
16 Identify insects, weeds, and plant diseases	.76
18 Understand life cycle of weeds and insects	.74
6 Recommend seeds for local conditions	.69
12 Handle and apply fertilizers with approved methods and equipment	.68
22 Recommend plant disease control programs	.66
8 Understand principles of plant nutrition and growth	.63
15 Store and apply chemicals with approved methods and equipment	.63
20 Recommend chemicals and practices to control animal diseases and parasites	.61
4 Understand seed treatment and inoculation	.57
5 Understand seed production and germination	.56
2 Knowledge of seed certification requirements	.56

B-3. continued

Competency Factor Competency	Rotated Factor Loading
Factor 2 Agricultural Mechanics (structures, materials, power, equipment)	
35 Recommend building materials	-.78
39 Recommend auto and tractor supplies	-.76
37 Recommend heating, ventilation, and refrigeration equipment	-.72
36 Plan and recommend efficient farm buildings	-.67
34 Interpret sketches, drawings, and blueprints	-.66
38 Recommend petroleum products	-.66
33 Recommend automated materials handling equipment	-.63
32 Understand electric motors and equipment	-.57
4 Understand seed treatment and inoculation	-.52
31 Understand small engine repair and maintenance	-.51
30 Understand operation and repair of tools, equipment, and machines	-.50
Factor 3 Animal Science (livestock feeds, nutrition, health)	
27 Understand feeding management practices for animal and poultry health	-.74
29 Understand animal and poultry health	-.72
28 Plan and coordinate feeding programs	-.70
25 Knowledge of safe and quality feed storage	-.67
26 Understand purposes of different feeds	-.67
23 Understand feed formula laws and requirements	-.65
24 Understand feed formulation and processing	-.64

B-3. continued

Competency Factor Competency	Rotated Factor Loading
Factor 4 Repair and Maintenance of Facilities and Equipment	
65 Operate mill machinery and equipment	-.91
66 Operate trucks and other distribution equipment	-.90
67 Understand maintenance of facilities	-.84
30 Understand operation and repair of tools, equipment, and machines	-.51
31 Understand small engine repair and maintenance	-.50
25 Knowledge of safe and quality feed storage	-.40
Factor 5 Sales Skills	
43 Read and interpret trade journals	-.56
42 Be alert to new business opportunities	-.48
55 Determine prices based on markets, grade, transportation costs, and overhead	-.38
45 Keep public informed of products and services	-.38
Factor 6 Business Management and Economics	
53 Delegate responsibility and authority	.84
55 Determine prices based on markets, grade, transportation costs, and overhead	.73
48 Ability to record and compute a sales order	.71
49 Promote sales and set up displays	.71
51 Aid farmers in arranging credit	.71
58 Maintain complete and accurate records	.71
59 Analyze business records and financial statements	.71
60 Manage inventory, stock control, and warehousing	.69

B-3. continued

Competency Factor Competency	Rotated Factor Loading
Factor 6 Business Management and Economics - continued	
63 Operate business machines	.69
62 Provide products and services for farmers based upon a sound financial program	.68
52 Supervise workers and coordinate activities	.66
64 Understand technical manuals	.63
46 Ability to plan and schedule work	.61
56 Understand the principles of marketing	.61
54 Orient new workers to business duties	.57
50 Be alert to satisfying customer needs	.56
40 Maintain a cooperative spirit and sense of loyalty	.55
61 Understand worker welfare	.53
44 Use proper business nomenclature and terms	.52
Factor 7 Employee Traits and Job Responsibilities	
41 Be informed of policies relating to the business	-.60
40 Maintain a cooperative spirit and sense of loyalty	-.48
44 Use proper business nomenclature and terms	-.48
42 Be alert to new business opportunities	-.45
Factor 8 Office Skills and Practices	
47 Respect and promote safe operating practices	.60
46 Ability to plan and schedule work	.53
50 Be alert to satisfying customer needs	.46
45 Keep public informed of products and services	.43

B-4. Factor Analysis with Varimax Rotation of Sixty Seven Competencies at the To Advance Level for 11 Occupational Titles in Thirteen Independent Agricultural Supplies Stores

Competency Factor Competency	Rotated Factor Loading
Factor 1 Plant Science (chemicals, fertilizers, seeds)	
19 Recommend chemicals for weed control	.76
22 Recommend plant disease control programs	.74
17 Recommend chemicals to control insects	.72
20 Recommend chemicals and practices to control animal diseases and parasites	.72
9 Recognize nutritional deficiencies in plants	.71
16 Identify insects, weeds, and plant diseases	.71
7 Understand seeding and management practices for establishment of crops	.70
10 Interpret information from soil tests	.70
11 Recommend fertilizer programs for area crops	.70
21 Recommend chemicals to control rodents and predators	.70
13 Knowledge of soil classification and conservation	.69
6 Recommend seeds for local conditions	.68
Factor 2 Agricultural Mechanics (structures, materials, power, equipment)	
35 Recommend building materials	-.78
34 Interpret sketches, drawings, and blueprints	-.59
37 Recommend heating, ventilation, and refrigeration equipment	-.58
39 Recommend auto and tractor supplies	-.55
38 Recommend petroleum products	-.52
33 Recommend automated materials handling equipment	-.49
36 Plan and recommend efficient farm buildings	-.46

B-4. continued

Competency Factor Competency	Rotated Factor Loading
Factor 3 Animal Science (livestock feeds, nutrition, health)	
28 Plan and coordinate feeding programs	-.70
23 Understand feed formula laws and requirements	-.63
27 Understand feeding management practices for animal and poultry health	-.63
25 Knowledge of safe and quality feed storage	-.60
26 Understand purposes of different feeds	-.60
24 Understand feed formulation and processing	-.58
4 Understand seed treatment and inoculation	-.53
29 Understand animal and poultry health	-.51
Factor 4 Repair and Maintenance of Facilities and Equipment	
31 Understand small engine repair and maintenance	.82
65 Operate mill machinery and equipment	.82
66 Operate trucks and other distribution equipment	.82
67 Understand maintenance of facilities	.73
30 Understand operation and repair of tools, equipment, and machines	.72
32 Understand electric motors and equipment	.68
Factor 5 Sales Skills	
58 Maintain complete and accurate records	.70
64 Understand technical manuals	.67
63 Operate business machines	.62
49 Promote sales and set up displays	.52
46 Ability to plan and schedule work	.51
48 Ability to record and compute a sales order	.49

B-4. continued

Competency Factor Competency	Rotated Factor Loading
Factor 6 Business Management and Economics	
54 Orient new workers to business duties	.84
53 Delegate responsibility and authority	.82
52 Supervise workers and coordinate activities	.76
55 Determine prices based on markets, grade, transportation costs, and overhead	.74
60 Manage inventory, stock control, and warehousing	.73
51 Aid farmers in arranging credit	.60
57 Plan economical transportation, processing, and handling operations	.57
43 Read and interpret trade journals	.55
62 Provide products and services for farmers based upon a sound financial program	.55
Factor 7 Employee Traits and Job Responsibilities	
41 Be informed of policies relating to the business	.68
40 Maintain a cooperative spirit and sense of loyalty	.60
42 Be alert to new business opportunities	.57
44 Use proper business nomenclature and terms	.40
Factor 8 Office Skills and Practices	
61 Understand worker welfare	-.73
59 Analyze business records and financial statements	-.56
63 Operate business machines	-.42

APPENDIX C

Competency Factor Scores for _To_ _Enter_ and _To Advance_ by Occupational Title Groups and Competency Factors in Cooperative and Independent Agricultural Supplies Stores

C-1. Competency Factor Scores by Factored Occupational Title Groups for Training Needed To Enter Occupations in Cooperative Agricultural Supplies Stores

	Competency Factor Scores Needed by Factored Occupational Title Groups			
Competency Factors	Service Worker	Salesman	Office Worker	Manager
Plant Science (chemicals, fertilizers, seeds)	1.4	2.1	1.2	2.2
Agricultural Mechanics (structures, materials, power, equipment)	1.6	1.5	1.1	1.4
Animal Science (livestock feeds, nutrition, health)	2.0	2.1	1.1	2.3
Repair and Maintenance of Facilities and Equipment	2.5	1.7	1.0	1.9
Feed and Seed Sales and Service	2.0	2.1	1.4	2.3
Business Management and Economics	1.9	1.4	1.7	2.6
Employee Traits and Job Responsibilities	2.6	2.4	2.3	2.7
Office Skills and Practices	1.9	1.4	2.2	2.1

C-2. Competency Factor Scores by Factored Occupational Title Groups for Training Needed To Advance in Occupations in Cooperative Agricultural Supplies Stores

	Competency Factor Scores Needed by Factored Occupational Title Groups			
Competency Factors	Service Worker	Salesman	Office Worker	Manager
Plant Science (chemicals, fertilizers, seeds)	2.0	2.6	1.4	2.8
Agricultural Mechanics (structures, materials, power, equipment)	2.4	2.4	1.3	1.9
Animal Science (livestock feeds, nutrition, health)	2.7	2.5	1.5	2.8
Chemical and Equipment Sales and Service	2.2	2.7	1.5	2.4
Employer-Employee Relations	2.7	2.9	2.5	2.9
Business Management and Economics	2.3	2.9	2.5	2.9
Employee Traits and Job Responsibilities	2.7	2.9	2.6	3.0
Office Skills and Practices	2.4	2.7	2.9	2.4

C-3. Competency Factor Scores by Factored Occupational Title Groups for Training Needed To Enter Occupations in Independent Agricultural Supplies Stores

Competency Factor	Competency Factor Scores Needed by Factored Occupational Title Groups			
	Sales and Office Worker	Service Worker (Equipment)	Manager	Service Worker
Plant Science (chemicals, fertilizers, seeds)	1.4	1.5	2.2	2.1
Agricultural Mechanics (structures, materials, power, equipment)	1.3	1.2	1.4	1.6
Animal Science (livestock feeds, nutrition, health)	1.5	1.4	2.5	1.7
Repair and Maintenance of Facilities and Equipment	1.5	2.0	2.0	1.6
Sales Skills	2.1	1.6	2.3	1.9
Business Management and Economics	2.2	1.4	2.3	1.6
Employee Traits and Job Responsibilities	2.3	1.9	2.3	2.1
Office Skills and Practices	2.4	1.8	2.5	2.1

C-4. Competency Factor Scores by Factored Occupational Title Groups for Training Needed To Advance in Occupations in Independent Agricultural Supplies Stores

Competency Factors	Competency Factor Scores Needed by Factored Occupational Title Groups: Sales and Office Worker	Service Worker (Equipment)	Manager	Service Worker
Plant Science (chemicals, fertilizers, seeds)	1.7	1.5	2.6	2.9
Agricultural Mechanics (structures, materials, power, equipment)	1.3	1.5	1.7	1.5
Animal Science (livestock feeds, nutrition, health)	1.6	2.0	2.8	2.8
Repair and Maintenance of Facilities and Equipment	1.3	2.3	2.1	2.3
Sales Skills	2.8	2.0	2.8	2.6
Business Management and Economics	2.2	1.9	2.9	2.2
Employee Traits and Job Responsibilities	2.5	2.5	2.9	2.5
Office Skills and Practices	2.8	1.6	2.5	2.2